USER'S GUIDE

DISPLAY WORKSTATION

Version 2.0

RAYPAX

makes medical images On-Line

About This Manual

Thank you for purchasing our RAYPAX PACS solution.

RAYPAX is a PACS (Picture Archiving and Communication System) that can capture, diagnose, review, and archive medical images and patient data.

This User's Manual was written to help users to better understand and use the functions of the RAYPAX system.

Please read this manual thoroughly before operating the RAYPAX system.

This manual should be kept for reference purposes.

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1 Getting Started

Display Workstation Introduction

The RAYPAX Display Workstation is a specialized medical viewing system for diagnostic purposes. It also acts as a PC-based medical viewing system designed for routine clinical use at a hospital or other medical institution.

The RAYPAX Display Workstation allows loading, displaying, and manipulating of virtually any medical image or patient study that may consist of an individual or series of digital images.

The basic functions of the RAYPAX Display Workstation are divided into finding/loading exams and viewing them. For finding and loading exams, the Exam Browser is used.

When the Exam Browser is used to select an exam, the Image Display Window provides effective tools for diagnosis. In the Image Display Window, the images are shown in a window utilizing numerous methods (various look-up tables are provided, and others can be used as well). Precise observation of images is achieved using image zooming or a magnification tool that can be dragged over images. Manipulation of images can also be done through inverting, flipping, or rotating, while filters offer various image enhancements for revealing specific features within images.

Cine looping is a valuable diagnostic tool that allows a series of images to be shown in sequence as a slide show, alone or in sync with other series.

Various types of measurement tools and annotations are provided that can

be used as overlays over images.

Reports can be generated while viewing the images of an exam. These reports are saved with the exam and are opened automatically when the exam is opened for viewing again.

RAYPAX Display Workstation runs under Microsoft Windows NT with the same user interface as Windows 95 and 98, which is familiar to millions of PC users.

Login

The following is the login window of the RAYPAX Display Workstation.

- **User Login Window**

Depending on the User ID, users have different authorization levels.

Depending on the User ID, users have different authorization levels.

Please refer to the Tool Option menu if a change in the password is desired.

Login window

Enter the User ID and Password, and select a server from the list of available servers.

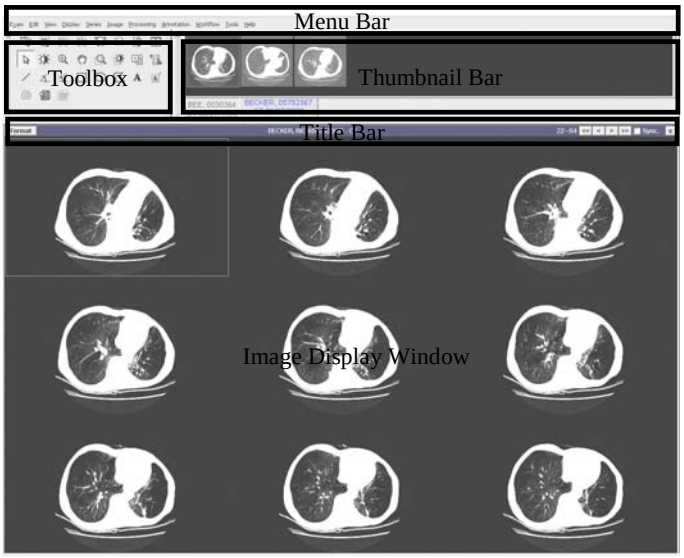
Click on the **OK** button to log into the RAYPAX Display Workstation; the main program of the RAYPAX Display Workstation will then be displayed.

Unregistered users must contact the administrator to request a User ID and Password.

Click on the **Quit** button to cancel the login process and exit the program.

2 Display Workstation

This section describes menu items in the RAYPAX Display Workstation main window.



RAYPAX Display Workstation GUI

There are two different types of menus in the RAYPAX Display Workstation; one is the menu of the main program window of the Display Workstation, and the other is in the Exam Browser window. (The menu of the Exam Browser is explained in Chapter 3.)

The Menu bar of the Display Workstation is composed of 10 menu items and a Help file. Clicking the right mouse button over an image will show an additional pop-up menu, for quick access to common functions.

The Thumbnail Bar displays a series of thumbnail images. Most of the time, the initial thumbnail image shown is selected from the middle of the series of images.

If an image in the thumbnail window is clicked, the image will be displayed in the Image Display Window.

Navigation and sync buttons in the Title Bar

In the title bar, there are **format**, **navigation** (with image counter), and **sync** buttons in addition to the patient's name, ID and modality of the selected exam.

The **format** button gives choices for customized views for the Image Display Window. After clicking once on the button, configure a view by moving the mouse over the grid until the desired format is highlighted, then click the mouse button again.

The **navigation** buttons allow selective movement between the first and last images of the selected exam, either by row (single arrow) or by page (double arrow). An image counter found on the left side of the buttons shows the number of the first image in the Image Display Window and the total number of images in the series.

If more than 2 series or exams are opened and the **sync** box is checked, the open exams or series can be compared. This is especially useful for viewing different MR series together for direct comparison.

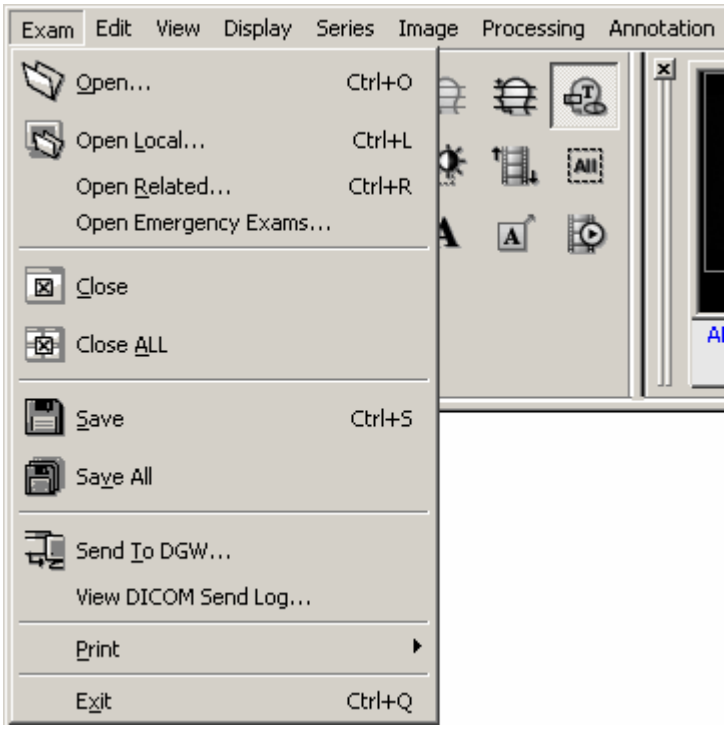
Menu bar

The Menu bar is composed of 10 menu items and a Help file.

Main Menu of Display Workstation

The following are descriptions of the submenus found within the Main Menu of the Display Workstation.

Exam



Open...

Open the Exam Browser by selecting **Open…** in the Menu bar or by clicking the **Open** icon in the Toolbox. (Please refer to *Chapter 3 Exam Browser*)

Open Local...

Open DICOM files that are saved on the local PC.

DICOM images can be displayed from the database, but local access of existing DICOM files is much faster.

Files can be previewed before opening, by checking the **Show Preview** box found at the bottom of the **Open DICOM Files** dialog box.

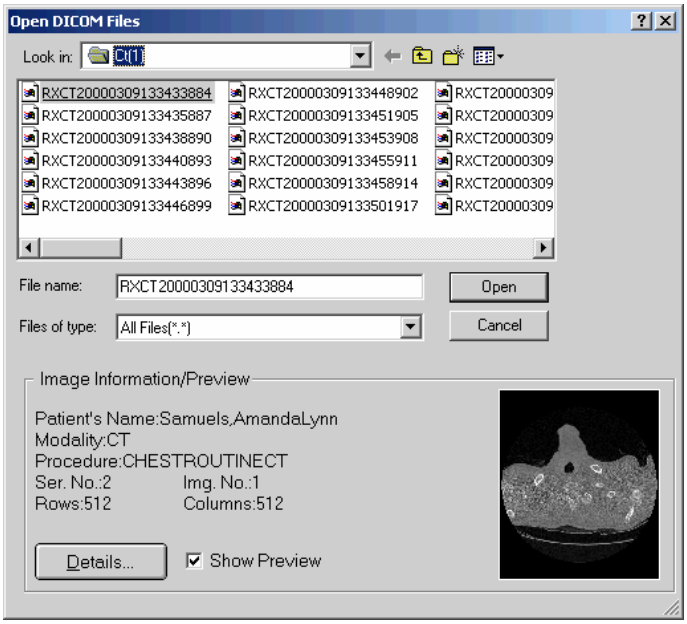
When selecting images that are to be opened, it is possible to select several files at the same time by using the **[Shift]** or **[Ctrl]** keys while

clicking on the desired files.

Any changes made to the images or exams will not be reflected on the database, rather it will only be saved locally.

The default DICOM file extension is 'DCM'.

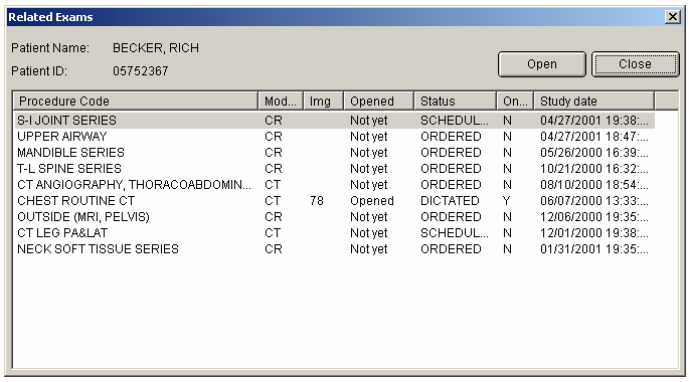
If a '*.dcm' file is clicked on, a preview image can be viewed.



Open DICOM Files Dialog

Open Related...

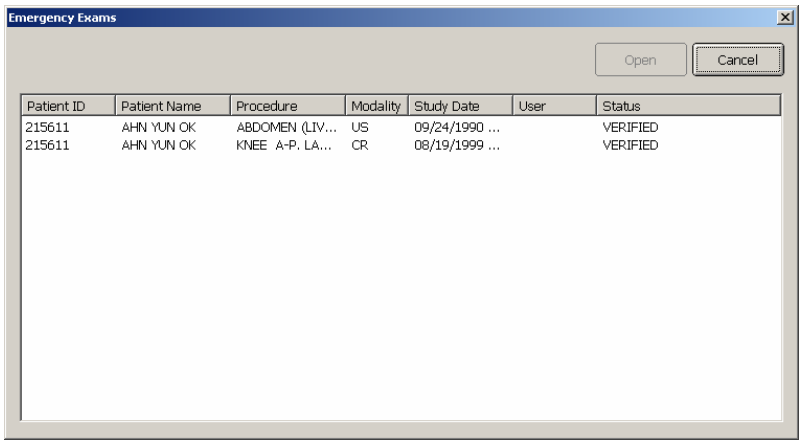
It shows all related exams for the selected patient in the **Related Exams** dialog box, which can then be opened as desired.


Related Exams
Patient Name: BECKER, RICH
Patient ID: 05752367
Open
Close
Procedure Code | Mod... | Img | Opened | Status | On... | Study date
S-I JOINT SERIES | CR | | Not yet | SCHEDUL... | N | 04/27/2001 19:38:...
UPPER AIRWAY | CR | | Not yet | ORDERED | N | 04/27/2001 18:47:...
MANDIBLE SERIES | CR | | Not yet | ORDERED | N | 05/26/2000 16:39:...
T-L SPINE SERIES | CR | | Not yet | ORDERED | N | 10/21/2000 16:32:...
CT ANGIOGRAPHY, THORACOABDOMIN... | CT | | Not yet | ORDERED | N | 08/10/2000 18:54:...
CHEST ROUTINE CT | CT | 78 | Opened | DICTATED | Y | 06/07/2000 13:33:...
OUTSIDE (MRI, PELVIS) | CR | | Not yet | ORDERED | N | 12/06/2000 19:35:...
CT LEG PA&LAT | CT | | Not yet | SCHEDUL... | N | 12/01/2000 19:38:...
NECK SOFT TISSUE SERIES | CR | | Not yet | ORDERED | N | 01/31/2001 19:35:...

Related Exams Dialog

Open Emergency Exams...

It shows all Emergency Exams. User can select and open the Emergency exam.



Emergency Exams Dialog

Close

This is used to close the currently open exam and to save changes that were made.

When closing the images that were open, it will suggest that everything be saved. Authorization is needed to save.

Close All

This is used to close all the exams and series that are currently open.

Save

Saves the position and annotations of the currently displayed image(s) in the selected exam.

Save All

Saves the position and annotations of all opened exams.

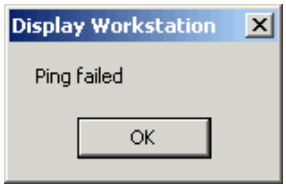
Send to DGW

Sends the currently displayed exam, with all DICOM images, to the DICOM Gateway.

After selecting the exam, or an image from the exam, and choosing **Send to DGW** the following **DICOM Send Dialog** box will appear. If user opens more than one exam, the opened exam list will show up. And user can Add or Delete a exam.

To test whether the DICOM Gateway is online or not, click on the **Ping** button. If the ping fails, the destination information may be wrong, or the DICOM Gateway may be offline.

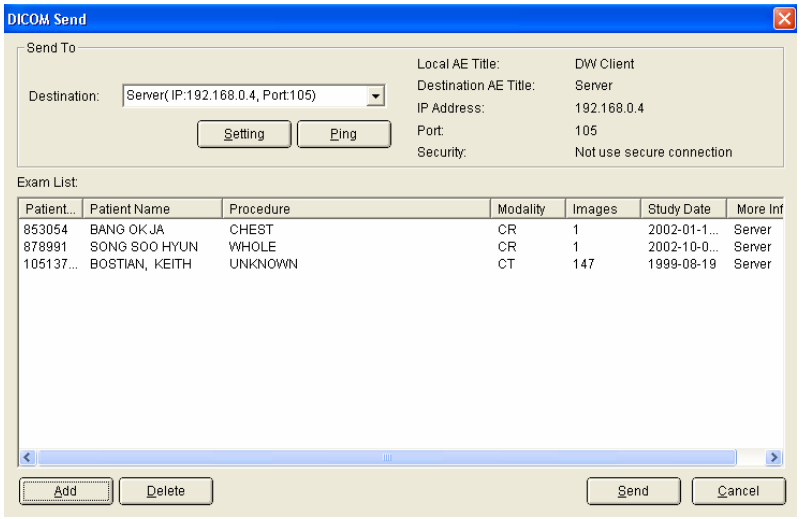
- **Example of Ping result**



To test if the DICOM Gateway is online, click the Ping button

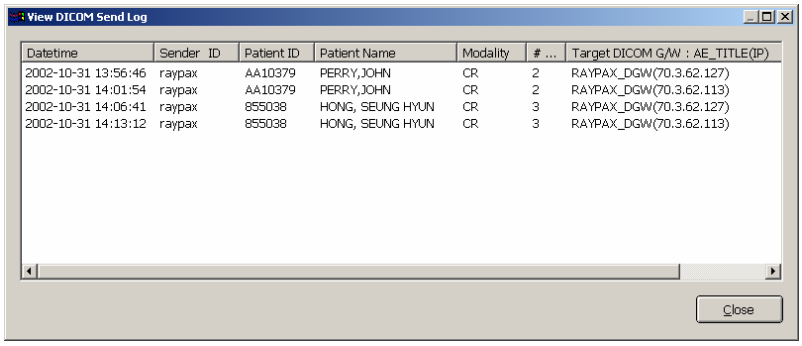
In order to send images to a different DICOM Gateway, click the Setting button and fill in the new destination information.

Please refer to Tools > Option > DICOM Gateway.



DICOM Send Dialog

View DICOM Send Log...


View DICOM Send Log
Datetime
Sender ID
Patient ID
Patient Name
Modality
...
Target DICOM G/W : AE_TITLE(IP)
2002-10-31 13:56:46 raypax AA10379 PERRY,JOHN CR 2 RAYPAX_DGW(70.3.62.127)
2002-10-31 14:01:54 raypax AA10379 PERRY,JOHN CR 2 RAYPAX_DGW(70.3.62.113)
2002-10-31 14:06:41 raypax 855038 HONG, SEUNG HYUN CR 3 RAYPAX_DGW(70.3.62.127)
2002-10-31 14:13:12 raypax 855038 HONG, SEUNG HYUN CR 3 RAYPAX_DGW(70.3.62.113)
Close

DICOM Send Log

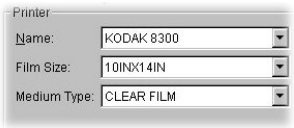
Print

- **Print menu from the main menu**

Prints the currently displayed images on film or paper.

Images displayed in the Image Display Window can be printed using a Windows compatible paper-based printer or a DICOM compliant laser film printer. The report for the selected images can also be printed on a paper-based printer.

- **Film Printer Information**

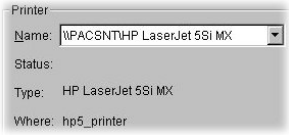


Select the name, size and type for the film printer.

The print range can be selected, and changes can be made to the film format type. All exam images, selected images, or key images can be printed separately using the **Print Range** function.

Before printing, check the names of the printers that are connected to the system. If no printer is connected as a Windows System printer, the paper print function will not work.

- **Paper Printer Information**



Select the printer name, like a Windows System printer.

RAYPAX Display Workstation supports Windows network printers. In this case, log onto the printer server before printing.

Each series of images from the preview images can be chosen separately for printing. By clicking on an image, it is possible to select or deselect a series to print.

Print Dialog Box

The following functions are only available when **Paper printer** is chosen under the **Print** menu.

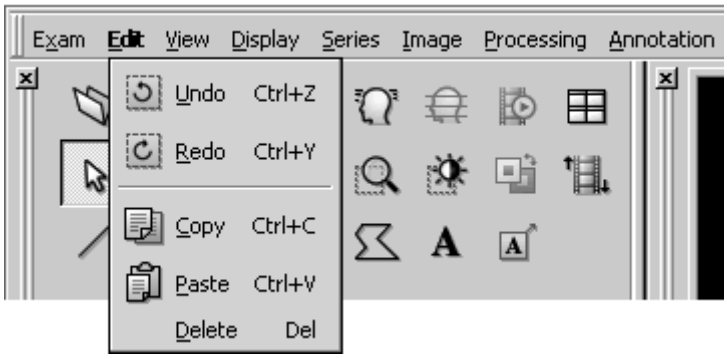
When the **Page Settings…** button is clicked, it will display the dialog box for **Report Print** under the **Options** menu. Please refer to the menu under **Tool** > **Options** > **Report Print**.

When the **Preview…** button is clicked, it will display a preview of what the printout will look like.

Exit

Performs a logout of the current user and exits from the RAYPAX Display Workstation to return to the login screen.

Edit



The **Edit** menu is activated only when the annotation menu is used.

Undo

The **Undo** command reverses the last edit or command regarding the annotations made to the active image. It can remove annotations and the changes made to them, but it cannot undo any modifications that have been saved.

To undo an action (before the image is saved),

- Press **[Ctrl]** + **[Z]**, or
- Choose **Edit** > **Undo**, or
- Click the **Undo** button in the Toolbox.

Redo

Actions that have been applied can be reversed using the **Undo** function, and actions that have been undone can be reapplied using the **Redo** function.

Redo can only be used if immediately preceded by an **Undo** action. If **Undo** is used and then other actions are applied, the **Redo** function will not be available.

To reapply actions that have been recently undone,

- Press **[Ctrl]** + **[Y]**, or
- Choose **Edit** > **Redo**, or
- Click the **Redo** button in the Toolbox.

Copy

Makes a copy of the selected annotation(s). Multiple annotations can be selected at the same time using the [**Shift]** or [**Ctrl]** keys.

To copy an annotation, select the annotation and

- Press **[Ctrl]** + **[C]**, or
- Choose **Edit** > **Copy** from the menu, or
- Click the **Copy** button in the Toolbox.

Paste

Pastes the copied annotation onto the selected image.

To paste an annotation, select the annotation(s), copy it using the **Copy** command and

- Press **[Ctrl]** + **[V]**, or

- Choose **Edit** > **Paste** from the menu, or
- Click the **Paste** button in the Toolbox.

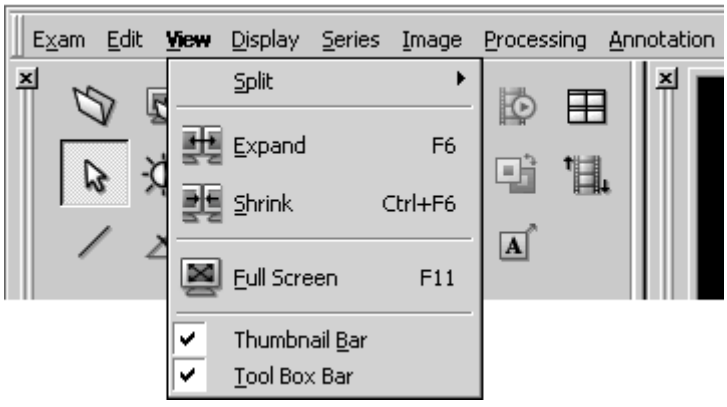
Delete

Deletes the selected annotation. It is possible to select multiple annotations for deletion using the [**Shift]** or [**Ctrl]** keys.

To delete an annotation, select the annotation and

- Press **[Del]**, or
- Choose **Edit** > **Delete** from the menu.

View



Split

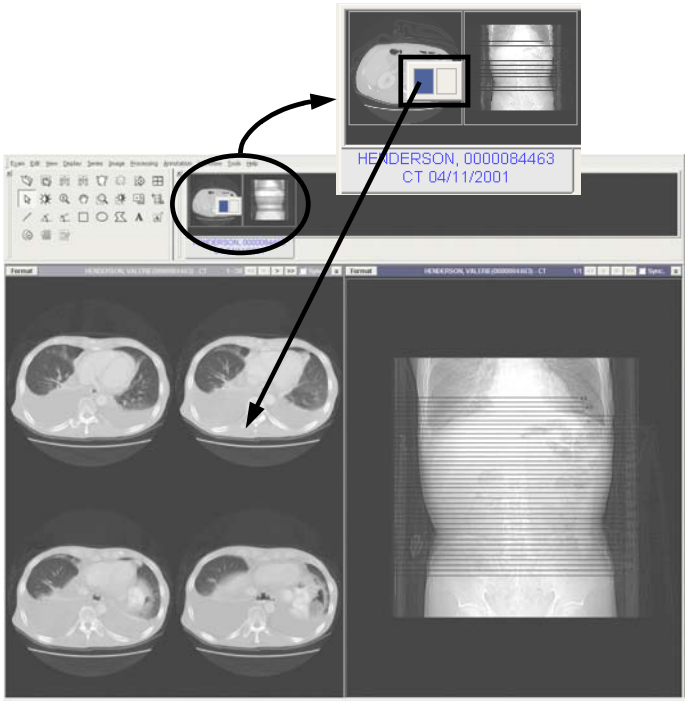
It divides the Image Display Window into 2 or 4 parts.

By doing so, various series from different exams can be compared at the same time using only a single monitor.

If this function is activated, then the **Expand** and **Shrink** functions will not be available.

The **Split** function gives the following viewing options,

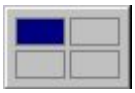
- **None**: It displays images on a single Image Display Window.
- **2V:** It divides the Image Display Window vertically into 2 sections. Therefore, an Image Display Window can be selected for each exam or series. It is useful when comparing images by series or by exam.
- **2H:** It divides the Image Display Window horizontally into 2 sections. It is possible to select an Image Display Window for each exam or series.
- **2X2:** It divides the Image Display Window into 4 sections.



Example for Split 2V

How to use the **Split** function:

- After selecting a viewing option from the **Split** menu, click the mouse button on an image from the selected series in the Thumbnail bar.



- A window selection grid will be displayed. For example, if the **2X2** menu is selected, it will display a 2x2 grid, as shown on left, to allow selection of a section of the Image Display Window to view the selected series.
- Select a section of the grid and the images of the selected series will be displayed in the corresponding section of the Image Display Window.

Expand

This function is available for multi-monitor systems (2 or more monitors).

It is useful for displaying several images from one series on 2 or more monitors on the same system.

To display the images of a series on one Image Display Window over more than one monitor, choose **View** > **Expand** or click the **Expand** button in the Toolbox.

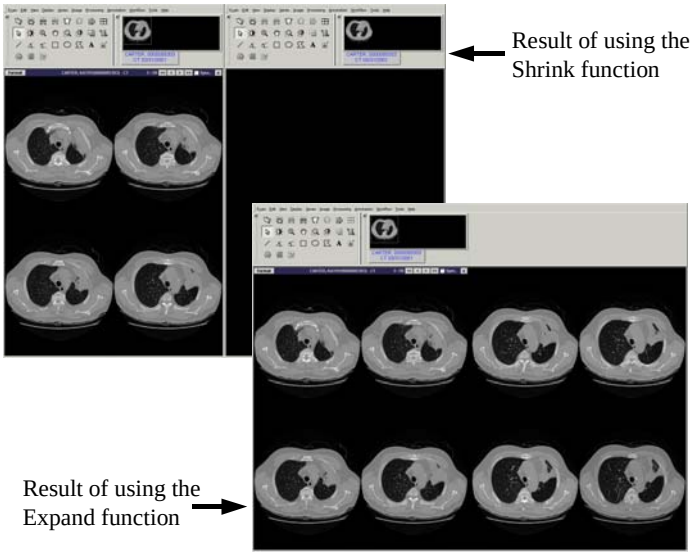
In order to use the **Expand** and **Shrink** functions, the **Monitor Configuration** under **Tools** > **Options** > **System** must be changed to reflect the number of monitors being used. Two or more monitors are required. Please refer to the **Tools** Menu.

Shrink

This function is available for multi-monitor systems (2 or more monitors).

The **Shrink** function is used to reverse the action of the **Expand** function above.

To display separate exams or images on individual Image Display Windows on each monitor, choose **View** > **Shrink** or click the **Shrink** button in the Toolbox.



Expand/Shrink for 2 Monitor System

Full Screen

This hides the **Toolbox** and **Thumbnail bar**, thus using the full screen for displaying images.

The **Toolbox** and **Thumbnail bar** can be hidden, and recalled, by choosing **View** > **Full Screen** or by pressing **[F11]**.

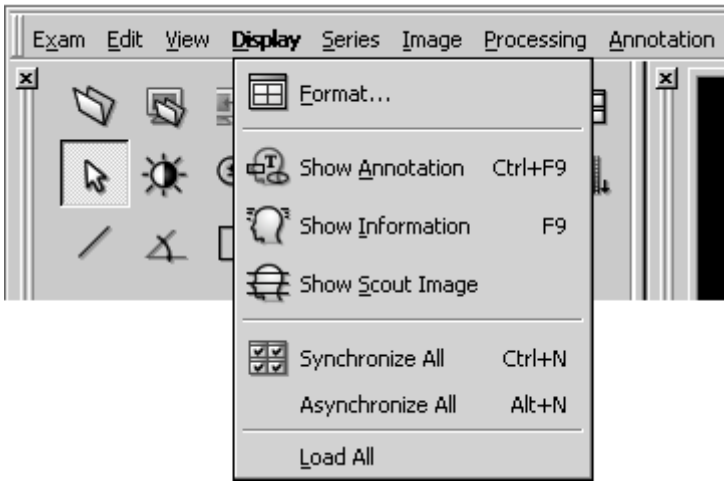
Thumbnail Bar

The **Thumbnail bar** can be hidden/shown, by deselecting/selecting it from the menu, as it is a toggle style menu.

Toolbox Bar

The **Toolbox** can be hidden/shown, by deselecting/selecting it from the menu, as it is a toggle style menu.

Display



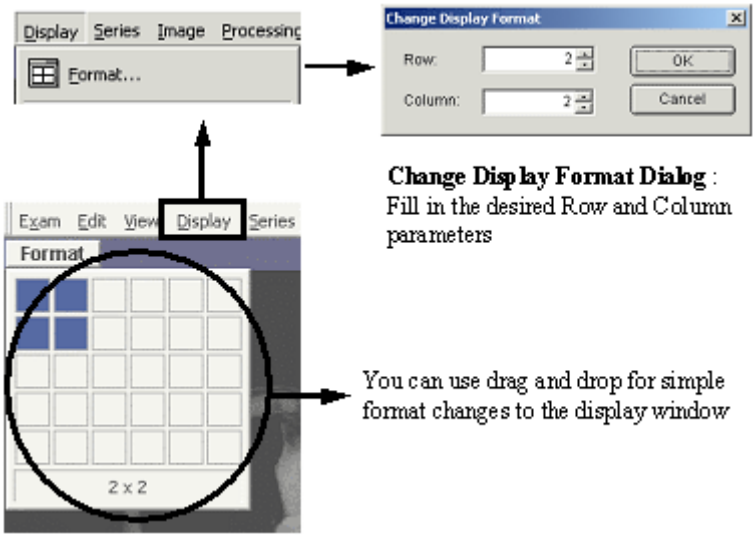
Format

The **Format** menu displays the current format of the Image Display Window by row and column.

It also allows configuration of the format of the Image Display Window. The row and column parameters can be configured from 1 through 16.

▪ **To change Format**

The format of the Image Display Window can also be conveniently changed using drag and drop.



Change Display Format

To change the format of the Image Display Window,

- Click the **Format** button on the upper left hand corner of the selected series, drag the mouse to select the desirable column and row layout, and then click the mouse button again, or
- Choose **Display** > **Format** from the menu and fill in the parameters for **Row** and **Column** in the dialog box, or
- Click the **Format** button in the Toolbox and fill in the parameters for **Row** and **Column** in the dialog box.

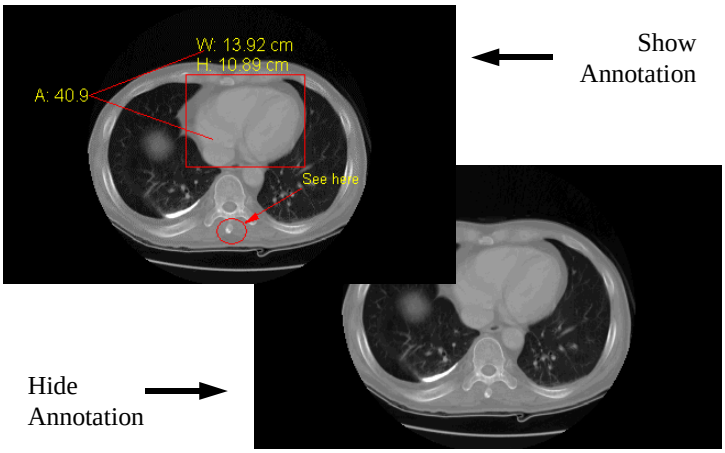
Show Annotation

Saved annotations can be shown/hidden by selecting/deselecting it from the menu, as it is a toggle style menu.

Annotations will not be displayed if the images in the Image Display Window do not have any annotations attached to them.

To show, or hide, annotations in the Image Display Window,

- Press **[Ctrl]** + **[F9]**, or
- Choose **Display** > **Show Annotation** from the menu, or
- Click the **Show Annotation** button in the Toolbox.



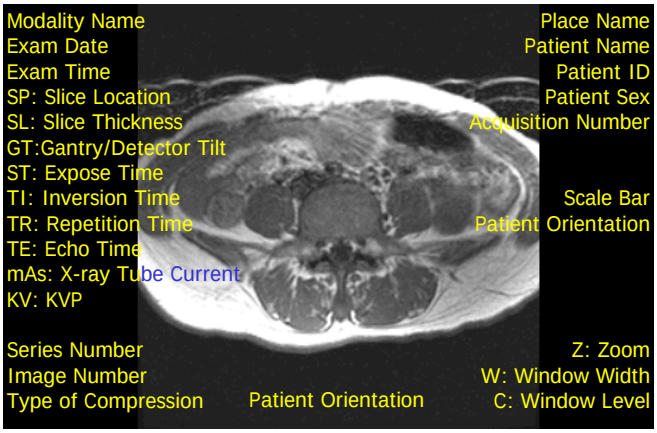
Show/Hide Annotation

Show Information

Information related to the images can be shown/hidden as an overlay on the images by selecting/deselecting it from the menu, as it is a toggle style menu.

The displayed information is read from the DICOM header for each image, and is different for each modality, such as CT, MRI, CT, etc. For example, for MR images, the TI, TR, and TE values are displayed; while for CT images, the KV and mAs values are displayed instead of TI, TR, and TE.

The following image shows a description of the basic information that is displayed for an image from the DICOM header.

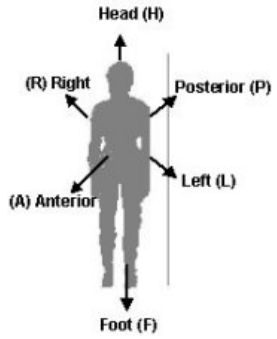


Description of image related information

To show, or hide, image information in the Image Display Window,

- Press **[F9]**, or
- Choose **Display** > **Show** Information from the menu, or
- Click the **Show Information** button in the Toolbox.

- **Patient Orientation**



This indicates the position and orientation of the image in relation to the patient when the image was captured.

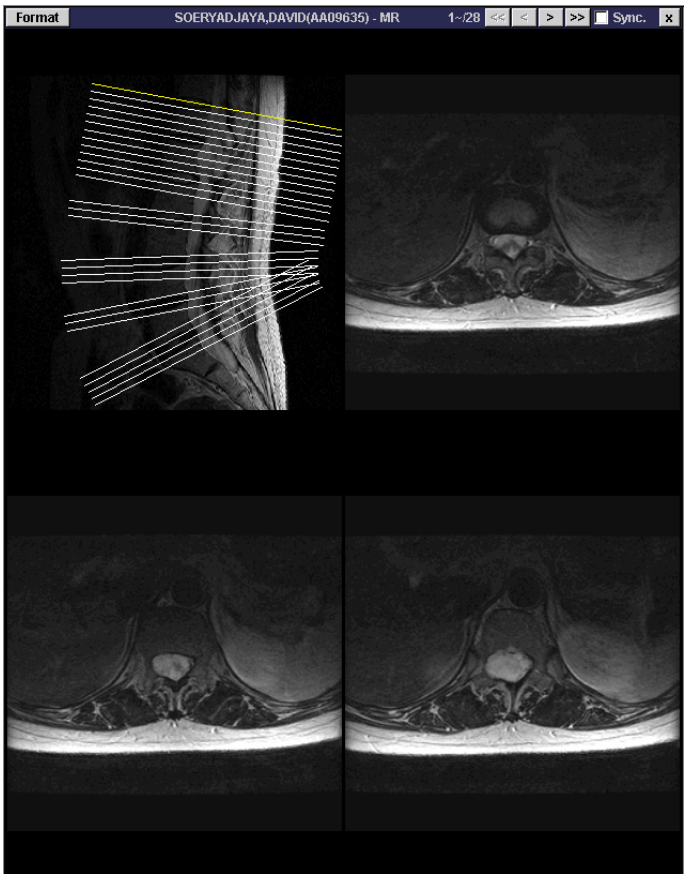
Show Scout Image

The scout image for the selected image series can be shown/hidden by selecting/deselecting it from the menu, as it is a toggle style menu.

To compare the images in a series, select one scout image. When the **navigation** button is clicked, the selected scout image will not move as the other images in the series are navigated.

To show, or hide, the scout image,

- Choose **Display** > **Show Scout Image** from the menu, or
- Click the **Show Scout Image** button in the Toolbox.



Show Scout Image

If the **Show Scout Image** menu item is not activated, go to **Add Scout**

Image in the **Series** menu. (Please refer to the **Series** menu.)

Synchronize All

This function synchronizes all windows in the Image Display Window when the **Split** function is used to create more than one window.

When **Synchronize All** is used, the sync box for all windows in the Image Display Window is checked.

To synchronize all windows in the Image Display Window,

- Press **[Ctrl]** + **[N]**, or
- Choose **Display** > **Synchronize All** from the menu, or
- Click the **Synchronize All** button in the Toolbox.

Asynchronize All

This function removes all synchronization among the windows in the Image Display Window.

When **Asynchronize All** is used, all sync boxes that are checked in any window in the Image Display Window are unchecked.

To asynchronize all windows in the Image Display Window,

- Press **[Alt]** + **[N]**, or
- Choose **Display** > **Asynchronize All** from the menu.

Load All Images

This function loads all images in a series into memory for immediate access.

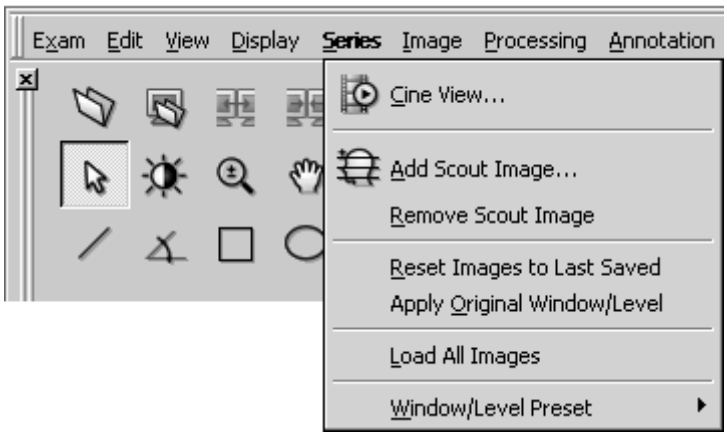
This allows for quicker access during diagnosis, without having to wait

for image loading when viewing new images.

To load all images into memory,

- Choose **Series** > **Load All Images** from the menu.

Series



Cine View...

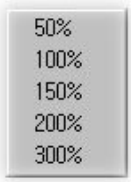
Cine View allows a series of images to be displayed in a sequential cinematic format, or in other words for movie-like viewing. The stack mode is used when the exam is composed of multiple images. Images in each series are stacked up and can be compared one by one.

To view images in the **Cine Viewer**,

- Choose **Series** > **Cine View…** from the menu, or
- Click the **Cine View** button in the Toolbox.

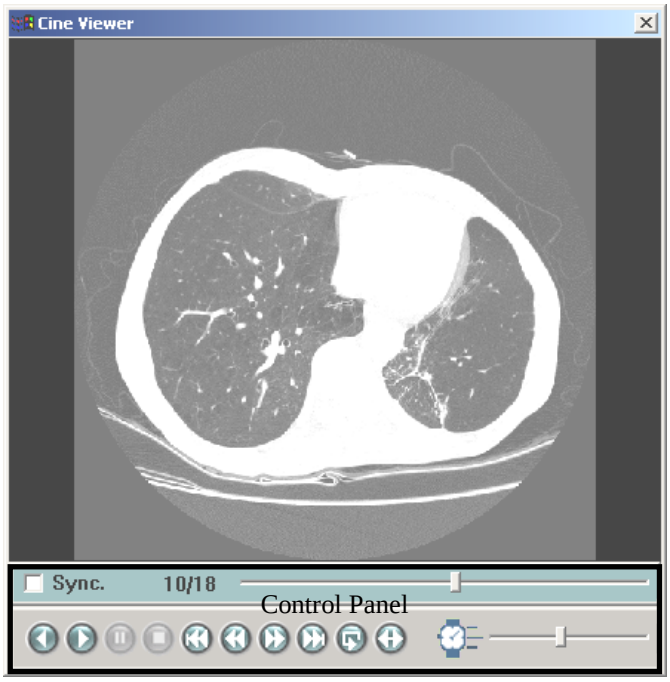
- **Popup menu for the Cine Viewer**

- **Zoom for Cine Viewer images**



The following **Cine Viewer** window will appear. Viewing controls can be found on the **Control Panel** at the bottom of the window, and on the popup menu after right-clicking on the **Cine Viewer** window. Images can also be navigated manually by moving the sliding bar immediately below the image on the top of the **Control Panel**, or by scrolling the wheel of the mouse.

Apart from the viewing controls (described on the side bar), the **Control Panel** also includes a **sync box** and an **image counter** that shows the current image number and the total number of images in the series.



Cine Viewer window

▪ **Cine Viewer Tool Icons**

Play Backward

Play Forward

Pause: Pause the Cine

Stop: Stop the Cine

First Image

Previous Image

Next Image

Last Image

Temporal: Continuous forward viewing

Spatial: Continuous viewing back and forth through the series

Cine frame rate control

The popup menu consists of the following functions,

- **Sync** Helps to compare images of each synced series at the same time.
- **View** Zoom in and out from 50% ~ 300% of the actual image size.
- **Viewing controls** Standard video and image navigation controls are provided. (These are the same as the controls found on the Menu bar)
- **Show Information** Show/Hide the image related information.

Add Scout Image

This function allows you to add a scout image to a series.

The reason a scout image is used is to show the slice position of the selected image in relation to a cross-section of the same image. A scout image is useful when the position of selected images, especially MR or CT images, need to be known.

The added scout image does not move (it is always the first image in the series), even during navigation through the images in the series. You can view the corresponding image for a scout line by clicking on the desired line, or by using the up and down arrows on the keyboard. Therefore, it is easy to determine exactly where a selected image comes from when using a scout image.

▪ **Scout Line**

Scout lines are often called cut lines for CT images, planning lines for MR images or, in general, intersection lines.

When using **Add Scout Image**, the **Show Scout Image** function is automatically selected. (Please refer to **Show Scout Image** under the **Display** menu)

To add a scout image to a series, click on the series to create the scout image for and

- Choose **Series** > **Add Scout Image** from the menu, or
- Click the **Add Scout Image** button in the Toolbox.

A dialog box will appear stating “Select Scout Image”. Click the **OK** button and select an image in another series to create the scout image from. The selected image should be scanned on a different axis than the series the scout image is being made for.

Remove Scout Image

This function removes the scout image from the selected series.

To remove the scout image from a series, click on the series from which the scout image is to be removed, and choose **Series** > **Remove Scout Image** from the menu.

Reset Images to Last Saved

This function reverts all images in the series to the state they were when they were saved last. Any changes that were made after the images were saved will be lost, and any changes that were made before the last save cannot be retrieved. This is useful when undesired changes have been made to images in the series. It is good practice to save images whenever important changes have been made.

Apply Original Window/Level

This function applies the original window width and level values found in the DICOM information for the selected series.

Load All Images

All images in a series can be loaded into memory for use. If all images are already loaded into memory, this function is disabled in the menu.

Window/Level Preset

Window/Level settings can be preset for use with any series of images.

Depending on the modality, certain Window/Level settings allow for better detail of images. When an ideal setting has been found, saving it as a Window/Level pre-defined setting will save time trying to adjust images in the future.

When Window/Level presets are made, they are available to the user through the **Window/Level Preset** drop-down list under the **Series** menu, or as hot keys that are determined by the user.

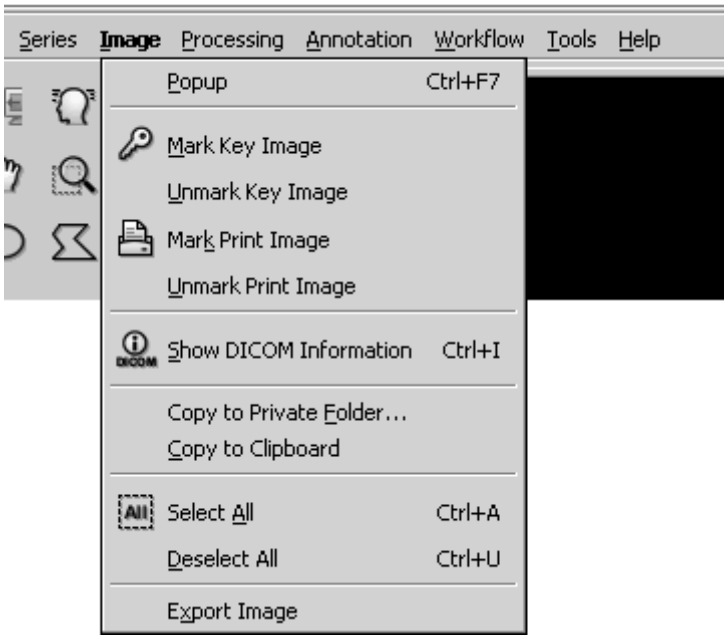
To save or create pre-defined Window/Level settings,

- Select **Series** > **Window/Level Preset** > **Edit Window/Level Preset** from the menu, or

- Press the hot key combination that you would like to save the preset to. (The available hot key combinations include **[Ctrl]** + a digit from **[1]**-**[0]**, and **[Alt]** + a digit from **[1]**-**[0]**)

Note: The Window and Level settings, and a changeable title (displaying the modality and procedure by default) are automatically entered when saving using the hot key method, but must be entered manually when using **Edit Window/Level Preset** from the menu.
Please refer to the **Window/Level Preset** tab under **Tools > Options**.

Image



Popup

This function allows an image to be viewed in its own **Popup Image Window**. It is useful for side-by-side comparison of the selected image with other images in the series.

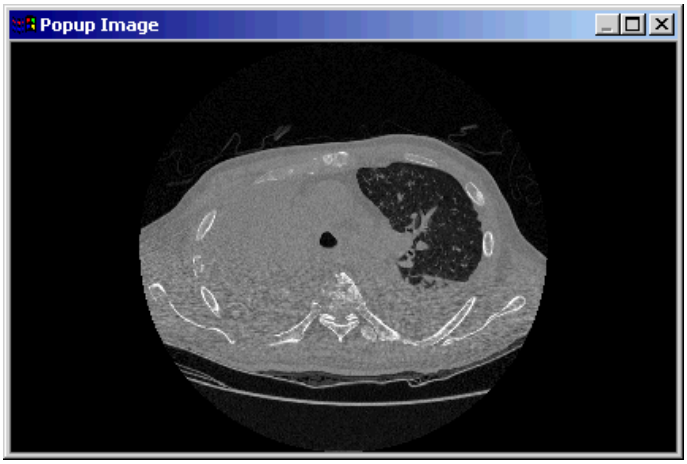
Popup images remain on top of the Image Display Window, so that navigation of the images in the series must be made behind the Popup Image Window. Size, window/level and other image characteristics of the popup window can be adjusted separately, but any changes made will be lost when the window is closed.

Image characteristics in the popup window can be adjusted as in the Image Display Window, and the size can be adjusted using the pull-down image menu or regular window controls found on the upper-right hand corner of the Popup Image Window.

To create a popup window, select an image to use as a popup image and

- Press **[Ctrl]** + **[F7]**, or

- Choose **Image** > **Popup** from the menu, or
- Choose **Popup Image** from the pull-down image menu, accessible after right-clicking on the image.



Popup Image Window

Mark Key Image

This function marks images in a series as **Key Images**. When saved, these **Key Images** can be viewed or printed separately from the rest of the exam or series.

Key Images are useful for marking important or significant images in a series. When used with the **Web Clinical System** (**WCS**), it shortens the download time by selecting only **Key Images** to view. **Key Images** can also be printed separately under the **Print Range** option of the **Print** function.

▪ **Key Images**

There are 4 display tabs in the image viewer of the WCS.

When the Key Image tab in the WCS image viewer is selected, it displays only the key images that were marked in the Display Workstation.

To mark an image as a **Key Image**, select the image and

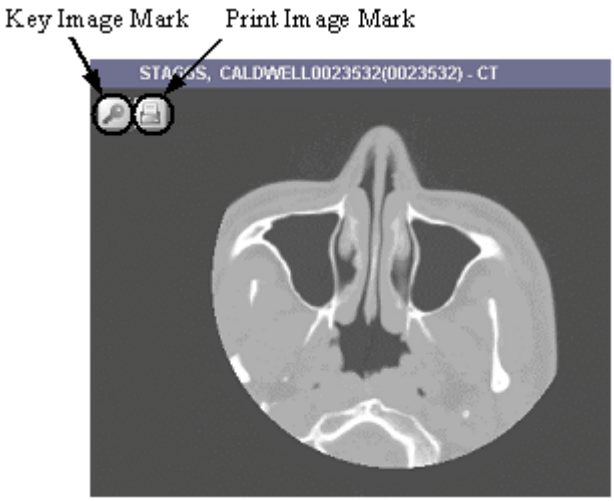
- Choose **Image** > **Mark Key Image** from the menu, or
- Click the **Mark Key Image** button in the Toolbox.

Unmark Key Image

This function unmarks a selected image marked as a **Key Image.**

To unmark an image as a **Key Image**, select the image and

- Choose **Image** > **Unmark Key Image** from the menu



Key Image and Print Image Marks

Mark Print Image

This function marks images in a series as **Print Images**. These **Print Images** can be printed separately as a batch from the rest of the exam or series.

The **Print Range** print option allows the marked **Print Images** to be printed separately by selecting **Selected Images**.

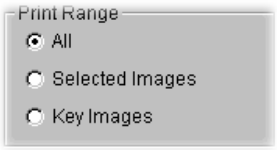
To mark an image as a **Print Image**, select the image and

- Choose **Image** > **Mark Print Image** from the menu, or
- Click the **Mark Print Image** button in the Toolbox.

Both Print Images and Key Images can be selected for the print range.

Only Print Images are printed when Selected Images is selected.

Only Key Images are printed when Key Images is selected.



Selecting Print Range

Unmark Print Image

This function unmarks a selected image marked as a **Print Image**.

To unmark an image as a **Print Image**, select the image and

- Choose **Image** > **Unmark Print Image** from the menu

Show DICOM Information

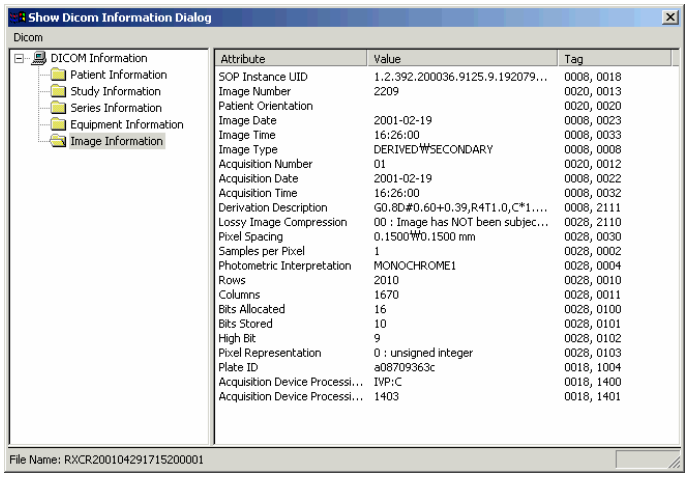
This function displays the **DICOM information** for the selected image.

DICOM files consist of header information and the image pixel raw data. Only the DICOM header information of the selected image can be seen.

The **DICOM information** is divided into 6 different sections: Patient, Study, Patient Study, Series, Equipment and Image information. Each section shows information attribute, value and tag data.

To display the **DICOM Information** for an image,

- Press **[Ctrl]** + **[I]**, or
- Choose **Image** > **Show DICOM Information** from the menu, or
- Choose **Show DICOM Information** from the pull-down image menu, accessible after right-clicking on the image, or
- Click the **Show DICOM Information** button in the Toolbox.


Show Dicom Information Dialog
Dicom
DICOM Information
Patient Information
Study Information
Series Information
Equipment Information
Image Information
Attribute
Value
Tag
SOP Instance UID 1.2.392.200036.9125.9.192079... 0008, 0018
Image Number 2209 0020, 0013
Patient Orientation 0020, 0020
Image Date 2001-02-19 0008, 0023
Image Time 16:26:00 0008, 0033
Image Type DERIVED₩SECONDARY 0008, 0008
Acquisition Number 01 0020, 0012
Acquisition Date 2001-02-19 0008, 0022
Acquisition Time 16:26:00 0008, 0032
Derivation Description G0.8D#0.60+0.39,R4T1.0,C*1.... 0008, 2111
Lossy Image Compression 00 : Image has NOT been subjec... 0028, 2110
Pixel Spacing 0.1500₩0.1500 mm 0028, 0030
Samples per Pixel 1 0028, 0002
Photometric Interpretation MONOCHROME1 0028, 0004
Rows 2010 0028, 0010
Columns 1670 0028, 0011
Bits Allocated 16 0028, 0100
Bits Stored 10 0028, 0101
High Bit 9 0028, 0102
Pixel Representation 0 : unsigned integer 0028, 0103
Plate ID a08709363c 0018, 1004
Acquisition Device Processi... IVP:C 0018, 1400
Acquisition Device Processi... 1403 0018, 1401
File Name: RXCR200104291715200001

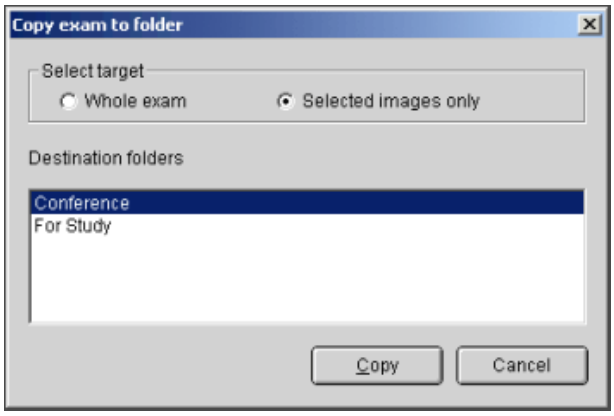
Show DICOM Information Dialog Box

Copy to Private Folder

This function allows selected images or the full exam to be copied into a private folder of the **Exam Browser**.

To copy images into a private folder,

- Select the images that are to be copied (The **[Ctrl]** and **[Shift]** keys can be used to select multiple images).
- Choose **Image** > **Copy to Private Folder** from the menu.
- The following dialog box will appear.



- Select the target. To copy all images in the series, select **Whole exam**.

To copy the selected images, select **Selected Images only**.

- Select the destination folder among the displayed private folders, and then click the **Copy** button. Otherwise, click the **Cancel** button to cancel the operation.

Copy to Clipboard

This function copies the currently selected image into the clipboard. The clipboard image can then be pasted into other application programs such as MS Word, PowerPoint, etc.

Select All

This function selects all images in the series.

When all images are selected, any function that is performed will be applied to all images.

To select all images in the series,

- Press **[Ctrl]** + **[A]**, or
- Choose **Image** > **Select All** from the menu, or
- Click the **Select All** button in the Toolbox.

Deselect All

This function deselects all images in the series.

To deselect all images in the series,

- Press [**Ctrl]** + [**U]**, or
- Choose **Image** > **Deselect All** from the menu.

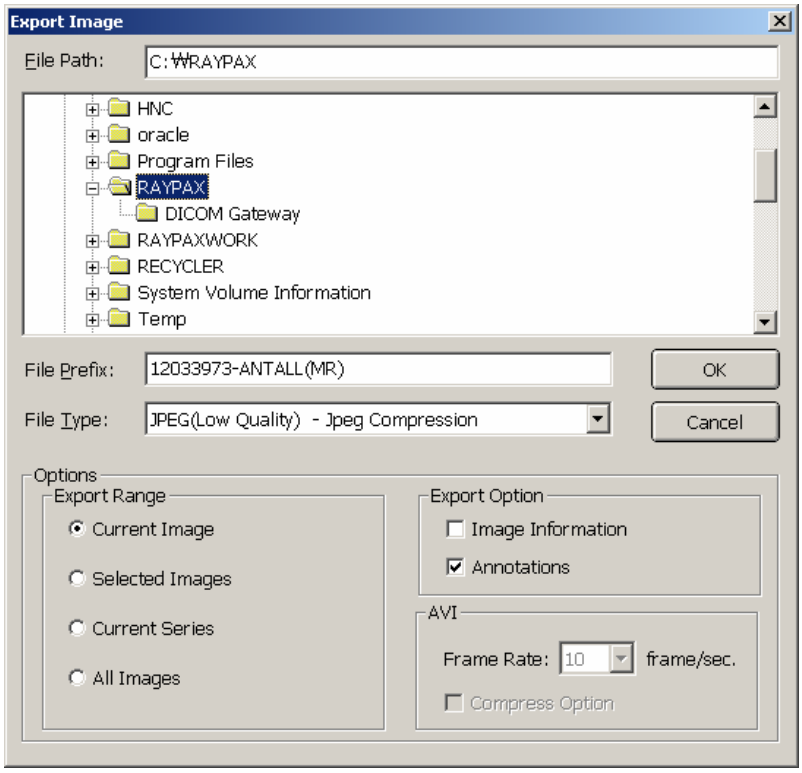
Export Image

This function exports the selected image(s) as a file on the local hard disk.

Export Image supports .bmp, .jpeg, avi and DICOM file formats. Image information and annotations can also be saved with the images for non-DICOM image files.

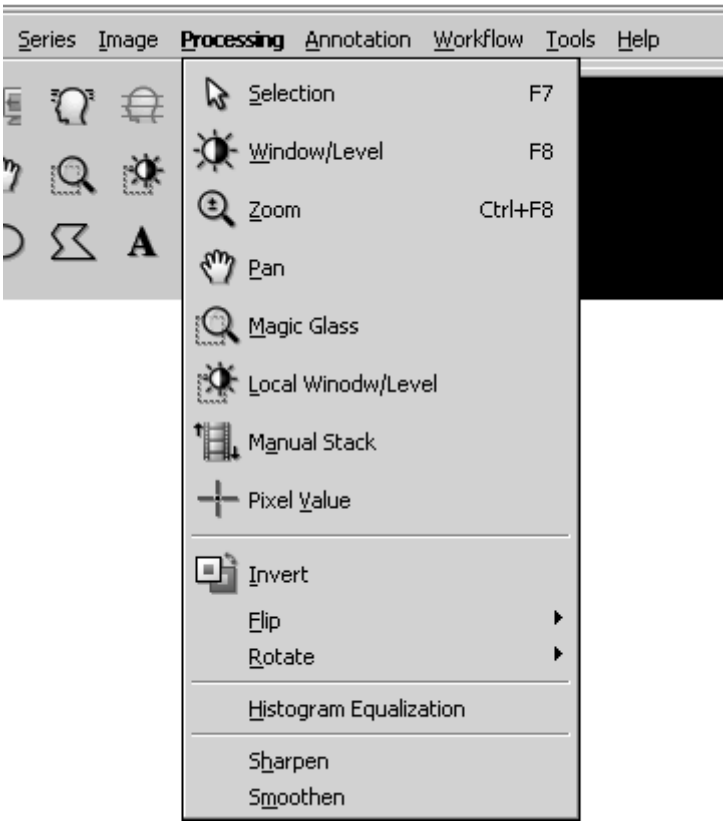
To export images as image files to the local hard disk, select the images that are to be exported and choose **Image** > **Export Image** from the menu. The following **Export Image** window will appear.

Type in the **File Path**, or select a directory from the directory tree. Type in the **File Prefix**, which is the title that will precede the image number if multiple images are selected. The default File Prefix shows the patient name and modality. Lastly, choose the **File Type**, **Export Range** and **Export Options** that are to be applied to the export operation. If user select AVI Format, user have to select Frame rate and press **OK**.



Export Image Window

Processing



Selection

This function allows images to be selected in the Image Display Window. Methods for selecting multiple images are available and are explained below. **Selection** is also used to de-select previously selected images.

To use the **Selection** function,

- Press **[F7]**, or
- Choose **Processing** > **Selection** from the menu, or
- Choose **Selection** from the popup image menu, or
- Click the **Selection** button in the Toolbox.

To select multiple images, use the following keys.

- **[Shift]** To select all images in a certain continuous range, select the first image and, while pressing the **[Shift]** key, click on the last image in the desired range. All images between the first and last image will be selected.
- **[Ctrl]** With the **[Ctrl]** key pressed down, select all desired images by clicking on them. If the image is already selected, clicking on it again will deselect it.

Window/Level

This function adjusts the displayed window/level values of the image.

To adjust the image contrast and brightness by changing the image window width and level,

- Choose **Processing** > **Window/Level** from the menu, or
- Choose **Window/Level** from the popup menu, or
- Click the **Window/Level** button in the Toolbox.

▪ **Window/Level**

While clicking and holding the left mouse button the following adjustments can be made,

Dragging Up

Increase Level

Dragging Down

Decrease Level

Dragging Right

Increase Window

Dragging Left

Decrease Window

To adjust the window/level,

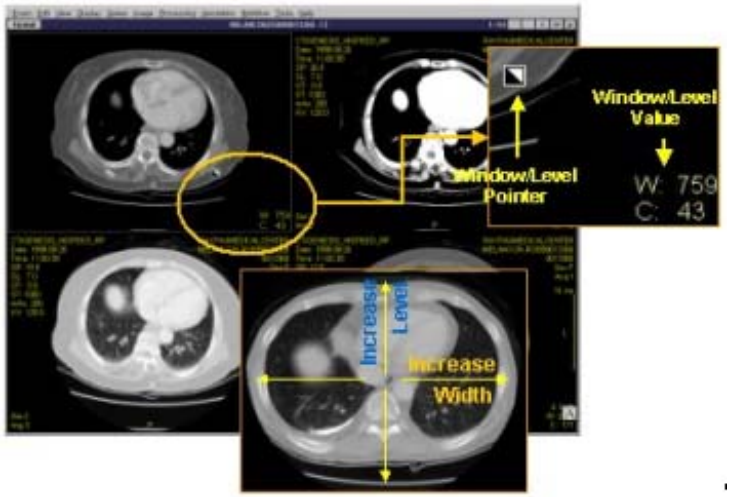
- While clicking and holding the left mouse button, dragging the mouse to the right will increase the window value (i.e., decrease contrast), while dragging the mouse to the left will decrease it (i.e., increase contrast).

- While clicking and holding the left mouse button, dragging the mouse upward will increase the level value (i.e., increase brightness), while dragging the mouse downward will decrease it (i.e., decrease brightness)

By dragging the mouse left and right, up and down, the Window/Level value will change

▪ **Right Mouse Button**

The Window/Level can be adjusted by using the right mouse button regardless of what function is being used. In other words, even when using another function, the Window/Level can be changed without switching functions.



Adjust Window/Level Value

Zoom

This function allows you to enlarge or shrink a selected image.

The image can be enlarged to a maximum of 16 times its original size, while it can be shrunk to the size of the fixed window.

▪ **Zoom**

While clicking and holding the left mouse button the following adjustments can be made,

Dragging Up

Zoom in

Dragging Down

Zoom out

To use the **Zoom** function,

- Select **Processing** > **Zoom** from the menu, or
- Select **Zoom** from the popup menu, or
- Click the **Zoom** button in the Toolbox.

Select the desired image and press and hold the left mouse button. If the

mouse is dragged up, the image zooms in; if it is dragged down, the image zooms out.

Pan

This function allows you to move an image within the viewing window when the image is larger than the window.

When zooming or magnifying an image, it will become larger than the viewing window. It is then that panning (moving the image within a viewing window) becomes useful.

Click and hold the left mouse button, then drag the mouse to view other parts of the image.

When the left mouse button is clicked and held, the X and Y coordinate values can be seen at the bottom right-hand corner of the Image Display Window. This value corresponds to the relation of the viewed point to the vertex in the original image.

To use the **Pan** function,

- Select **Processing** > **Pan** from the menu, or
- Select **Pan** from the popup menu, or
- Click the **Pan** button in the Toolbox.

Magic Glass

The **Magic Glass** function has undergone some significant improvements. It is now possible to change the size of the **Magic Glass** window independently of the underlying viewing window, as well as apply independent window/level settings to the contents of the magic glass. Zoom in the **Magic Glass** window can also be increased to a greater magnification, which is especially useful for high-resolution systems.

- **Magic Glass**

While clicking and holding the left mouse button the following adjustments can be made,

[Shift]

Window/Level

[Ctrl]

Zoom

[Shift]+[Ctrl]

Magic Glass size

Magic Glass creates a small magnifying window that allows quick magnification of a small area of an image. When an image is currently displayed at a size equal to or larger than the size defined by the DICOM header information (for example, after zooming), the magnification ratio is 2:1. When an image is currently displayed at a size smaller than the size defined by the DICOM header information, the magnification ratio is 1:1.

The default zoom ratio of the magic glass is twice as large as the zoom ratio of the currently displayed image.

To use the **Magic Glass** function,

- Select **Processing** > **Magic Glass** from the menu, or
- Select **Magic Glass** from the popup menu, or
- Click the **Magic Glass** button in the Toolbox.

To change the size of the **Magic Glass** window, press the **[Shift]** and **[Ctrl]** keys together while clicking the left mouse button, and then move the mouse to enlarge or shrink the size of the window.

By pressing **[Shift]** while clicking the left mouse button, the window/level value can be changed by moving the mouse.

The method to change the window/level value is the same as the **Window/Level** function. (Please refer to **Window/Level** for details)

By pressing **[Ctrl]** while clicking the left mouse button, the magnification

of the image in the magic glass can be changed by moving the mouse up or down.

Local Window/Level

This functions works in the same manner as the **Window/Level** function. However, **Window/Level** changes the values of the selected image manually while **Local Window/Level** changes the window/level values of the image based on the values in the selected local area. It is useful for viewing the full image in relation to the **Window/Level** of a certain area of the image.

- **Local Window/Level**

The window/level values in the selected area can be applied to the whole image.

To use the **Local Window/Level** function,

- Select **Processing** > **Local Window/Level** from the menu, or
- Select **Local Window/Level** from the popup menu, or
- Click the **Local Window/Level** button in the Toolbox.

Click the left mouse button and drag the mouse to form a local window over the desired area of the image. Dragging the mouse will change the window/level values displayed on the bottom right-hand corner of the Image Display Window. The window/level value of the entire image will change to the value in the selected area when the mouse button is released.

Manual Stack

This function allows stacking of images for sequential viewing from a single image view.

Manual Stack gives the convenience of scrolling through the images in a series in a single image view using mouse movements. This allows the use of the largest possible image view for viewing and diagnosis. When using **Manual Stack** with a viewing configuration of more than one image, the order of images surrounding the viewed image will change accordingly when finished scrolling.

▪ **Manual Stack**

While clicking and holding the left mouse button the following adjustments can be made,

Dragging Up

Move Backward

Dragging Down

Move Forward

To use the **Manual Stack** function,

- Select **Processing** > **Manual Stack** from the menu, or
- Select **Manual Stack** from the popup menu, or
- Click the **Manual Stack** button in the Toolbox.

To scroll through the images in the series, click and hold the left mouse button over the image and move the mouse up or down. Moving the mouse up will scroll backwards in the series, and moving the mouse down will scroll forward in the series. The image number will be displayed on the bottom right-hand corner of the image while scrolling.

Pixel Value

This function displays the **pixel value** and **coordinates** where the mouse pointer (shown as cross hairs) is located.

▪ **Pixel Value**

8bit grayscale image

Grayscale value (0 ~ 255)

9bit or higher bit grayscale image

Raw value (-32767 ~ 32768)

Color image

RGB value (0 ~ 255)

Several CT image

Hounsfield units value (-1024 ~ 1024)

Depending on the image type, the pixel value will have different meanings. The chart on the sidebar shows the meaning of the pixel value for various image types.

To use the **Pixel Value** function,

- Select **Processing** > **Pixel Value** from the menu, or
- Select **Pixel Value** from the popup menu, or
- Click the **Pixel Value** button in the Toolbox.

When the cross hairs (as seen in the icon on the side bar) appear on the

image, drag the mouse around to view the **pixel value** and the **coordinates** in the bottom right-hand corner of the image.

Invert

This function inverts the image to a negative grayscale image.

This means it reverses the gray shading of an image. Therefore, the black part of the image changes to white, and the white changes to black.

To use the **Invert** function,

- Select **Processing** > **Invert** from the menu, or
- Select **Invert** from the popup menu, or
- Click the **Invert** button in the Toolbox.

Flip

This function enables an image to be flipped on its vertical or horizontal axis.

- **Flip from the Main Menu**

This is useful if the image has been scanned upside down, or if another view of the image is desired.

To flip an image on its horizontal axis,

- Select **Processing** > **Flip** > **Horizontal** from the menu, or
- Select **Rotate/Flip** > **Flip Horizontal** from the popup menu, or
- Click the **Flip Horizontal** button in the Toolbox.

To flip an image on its vertical axis,

- Select **Processing** > **Flip** > **Vertical** in the menu, or
- Select **Rotate/Flip** > **Flip Vertical** from the popup menu, or

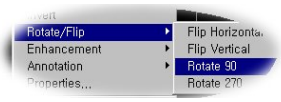
- Click the **Flip Vertical** button in the Toolbox.

Rotate

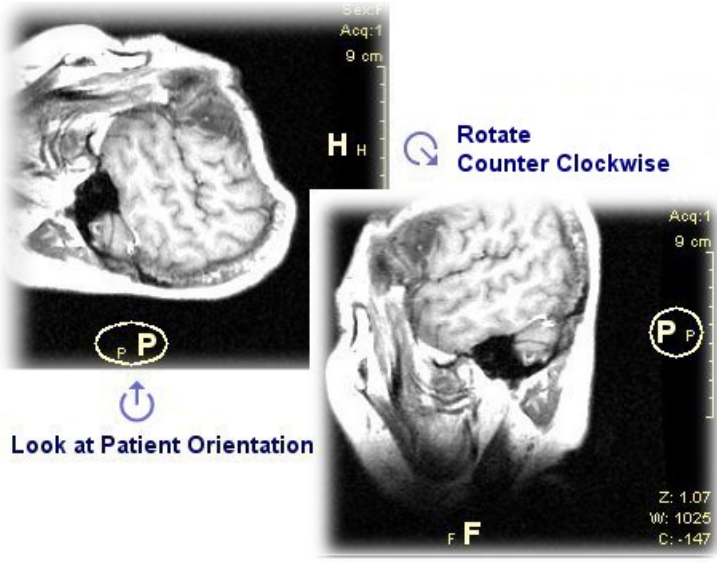
This function rotates an image in a counter-clockwise manner.

To **Rotate** an image,

- Select **Processing** > **Rotate** > **90** or **270** from the menu, or
- Select **Rotate/Flip** > **Rotate 90** or **Rotate 270** from the popup menu, or
- Click the **Rotate 90** button or **Rotate 270** button in the Toolbox.



After rotating an image, the patient orientation signs will change appropriately, as seen below.

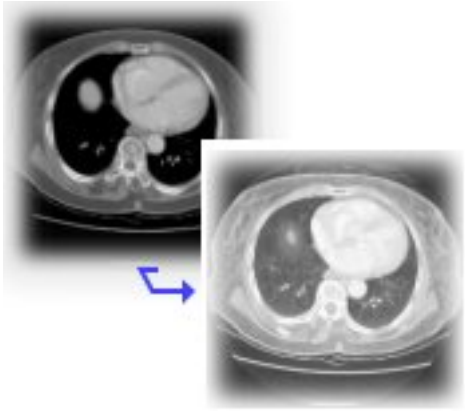


Histogram Equalization

Histogram Equalization is the image processing feature to adjust the distribution of brightness so that a visually better image can be created.

To apply **Histogram Equalization**, select an image and

- Select **Processing** > **Histogram Equalization** from the menu, or
- Select **Enhancement** > **Histogram Equalization** from the popup menu.



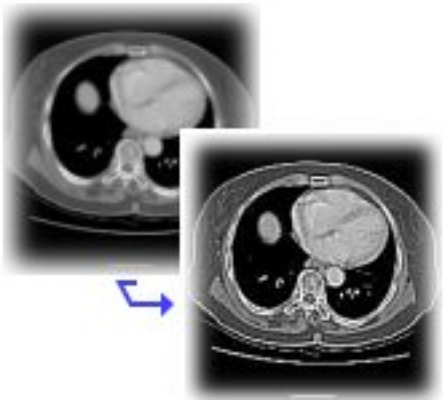
Example for Histogram Equalization

Sharpen

This function uses a filter that increases the visibility of small lines and fissures, which may otherwise be difficult to spot. It brings an image into better focus and sharpens the detail by increasing the contrast of adjacent pixels.

To **Sharpen** an image, select the image to sharpen and

- Select **Processing** > **Sharpen** from the menu, or
- Select **Enhancement** > **Sharpening** from the popup menu.



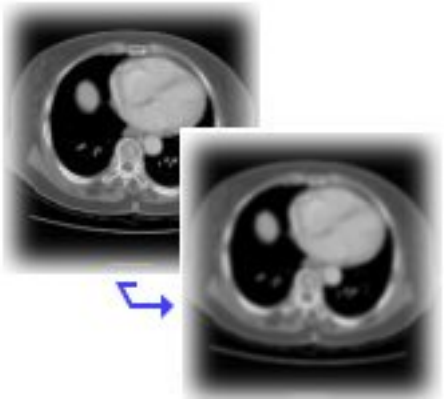
Example for Sharpen

Smoothen

This function uses a filter that effectively makes an image look smoother by softening hard or rough edges.

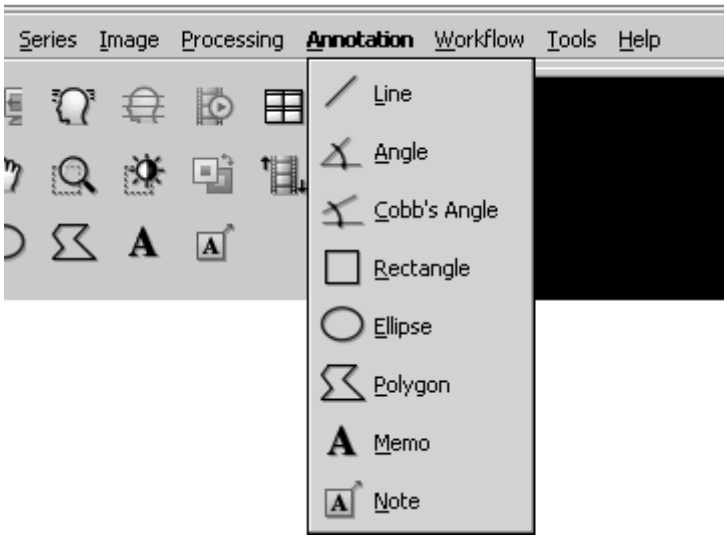
To **Smoothen** an image, select an image to smoothen and

- Select **Processing** > **Smoothen** from the menu, or
- Select **Enhancement** > **Smoothing** from the popup menu.



Example for Smoothen

Annotation



There are several types of annotation that can be added to images to indicate points of interest. Such annotation is created over the image that is being annotated; hence, the original image data is not altered. All annotation - such as text, markers, and measurement tools - will remain in the same relative position on the image even if pan or zoom is used.

Once an annotation has been created, it can be displayed, hidden, saved with the exam, or deleted.

To add an **Annotation**,

- Select the desired type of **Annotation** under **Annotation** from the menu, or
- Select the desired type of **Annotation** under **Annotation** from the popup menu.

To modify an **Annotation**, select the annotation to modify and

- Right-click on the image and select **Properties** from the popup menu.
- Select one of the following three tool tabs to modify properties; Size/Statistics, Color/Line and Text.

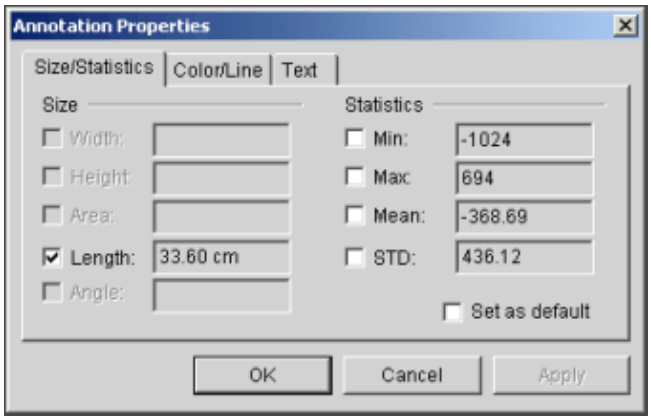
- After modifications are made, press **Apply** to preview the changes and continue modifying, or press **OK** to make the changes and close the window.

Annotation Properties: Size/Statistics

Mark the check box to display the corresponding information with the annotation.

- **Statistics**

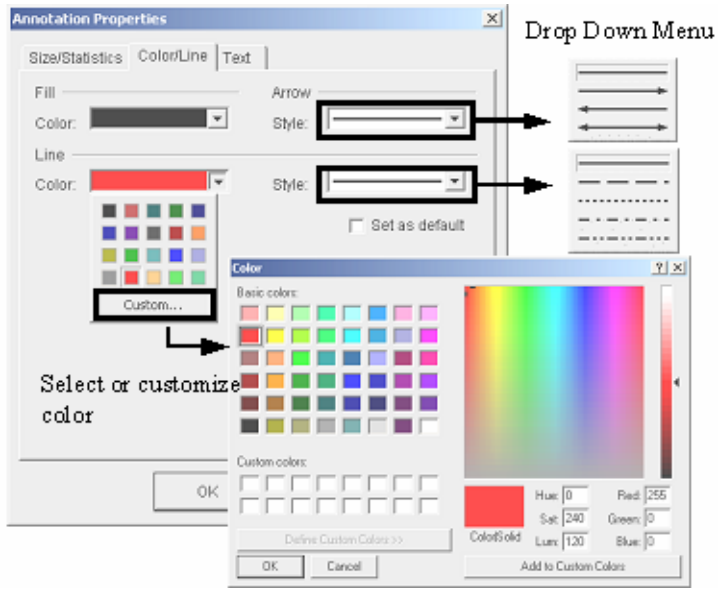
Displays the Minimum (Min), Maximum (Max), Average (Mean) and Standard Deviation (STD) Pixel Value of the selected annotation's area.



Size/Statistics Tab

Annotation Properties: Color/Line

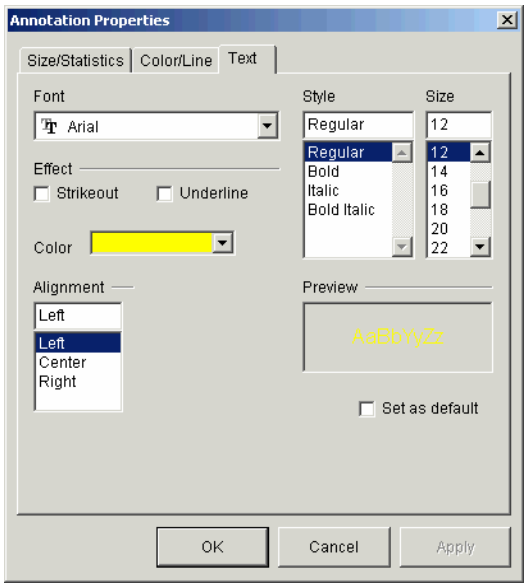
The color and line style of the annotation can be changed.



Color/Line Tab

Annotation Properties: Text

The text can be modified. Select the font, style, size, color, effect and alignment.



Text Tab

Line

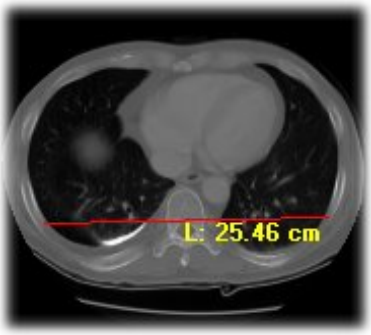
The length (distance) between two points can be measured, or points of interest can be indicated.

In accordance with the DICOM standard, distances are measured in millimeters for CT and MR studies and for some CR images.

To add a **Line**,

- Select **Annotation** > **Line** from the menu, or
- Select **Annotation** > **Line** from the popup menu, or
- Click the **Line** button in the Toolbox.

Place the crosshairs above the point you want to start the line and click and hold the mouse button. While holding down the mouse button, move to the point you want to end the line and release the mouse button.



Example of Line

Angle

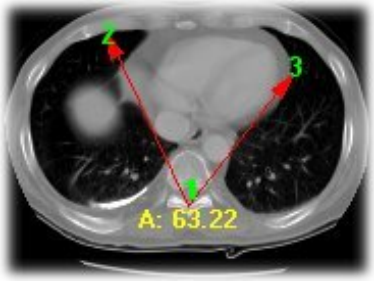
Measurements of an angle can be made.

To make a measurement of an angle,

- Select **Annotation** > **Angle** from the menu, or
- Select **Annotation** > **Angle** from the popup menu, or

- Click the **Angle** button in the Toolbox.

The first mouse click on the image will determine the location of the base of the angle. While holding down the mouse button, move the mouse along the desired axis of the first side of the angle and release the mouse button. After releasing the mouse button, move to the end point of the second axis and click the mouse button. An angle will be drawn in between the two end points.



Example of Angle

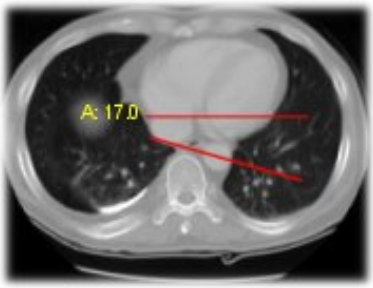
Cobb's Angle

Cobb's Angle measurements are particularly useful for small angles and when the intersection point is outside the image area.

To measure a **Cobb's Angle**,

- Select **Annotation** > **Cobb's Angle** from the menu, or
- Select **Annotation** > **Cobb's Angle** from the popup menu, or
- Click the **Cobb's Angle** button in the Toolbox.

Create a line that will form one side of the angle by clicking and dragging the mouse. Once the mouse button is released a second line forming the other side of the angle will appear along the horizontal axis making a positive angle. Both sides can be moved and aligned with the image as desired. The angle shown is for the angle between the two sides.



Example of Cobb's Angle

Rectangle

A rectangle can be created in the image window, showing height and width parameters.

To create a **Rectangle**,

- Select **Annotation** > **Rectangle** from the menu, or
- Select **Annotation** > **Rectangle** from the popup menu, or
- Click the **Rectangle** button in the Toolbox.

Click and drag the mouse to create a rectangle, and then release the mouse button to complete the annotation.

Example of Rectangle

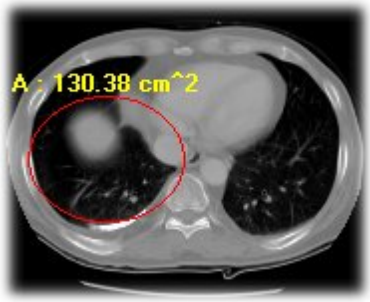
Ellipse

An ellipse can be created in the image window, showing the area of the created ellipse.

To create an **Ellipse**,

- Select **Annotation** > **Ellipse** from the menu, or
- Select **Annotation** > **Ellipse** from the popup menu, or
- Click the **Ellipse** button in the Toolbox.

Click and drag the mouse to create an ellipse, and then release the mouse button to complete the annotation.



Example of an Ellipse

Polygon

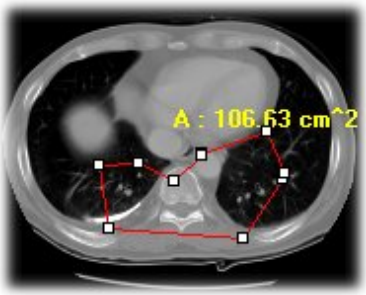
A polygonal region can be drawn with multiple points, showing the area and the length of the region.

To create a **Polygon**,

- Select **Annotation** > **Polygon** from the menu, or
- Select **Annotation** > **Polygon** from the popup menu, or
- Click the **Polygon** button in the Toolbox.

Click the mouse button over the starting point of the polygon, and

sequentially click the mouse button over all points of the polygon. When the last point is reached, instead of just clicking on it, double-click that point to end the polygon mapping. The points of the polygon can be moved around.



Example of a Polygon

Memo

Text can be added to an image, and edited later on.

To add a **Memo**,

- Select **Annotation** > **Memo** from the menu, or
- Select **Annotation** > **Memo** from the popup menu, or
- Click the **Memo** button in the Toolbox.

Click and drag the mouse to create a text box, and then enter the text for the memo.

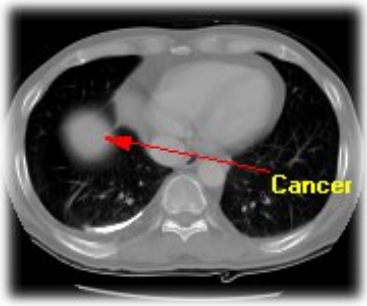
Example of Memo

Note

Text can be added to an image with a line showing the point in context. It is useful when text is written to indicate something on an image.

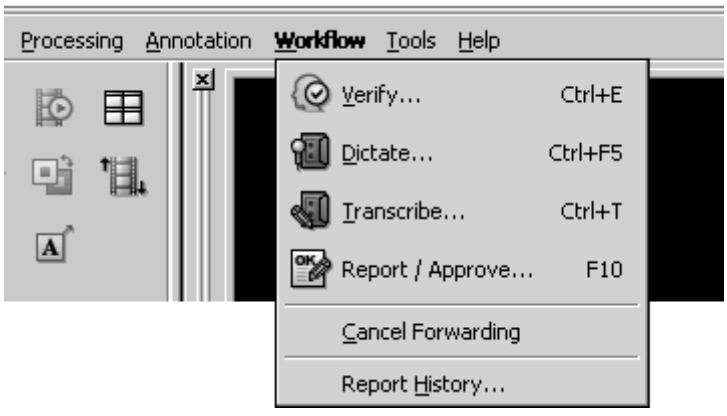
To add a **Note**,

- Select **Annotation** > **Note** from the menu, or
- Select **Annotation** > **Note** from the popup menu, or
- Click the **Note** button in the Toolbox.



Example of Note

Workflow



This function manages exam status in the RAYPAX system. The following are summarized descriptions of the RAYPAX Display Workstation workflow:

- Technicians select an exam from the [Root Folder/ Worklists/ Verification] folder in the Exam Browser and open the exam to verify.

- Technicians verify the selected exam after adjusting the image quality. During verification, the technician can select a specific radiologist to dictate the exam. In this case, the verified exam is automatically sent to the 'Unread' worklist of the selected radiologist only. If a radiologist is not selected, the verified exam is sent to the general 'Unread' worklist for all radiologists.

- Radiologists select an exam from the [Root Folder/ Worklists/ Unread] folder in the Exam Browser and open the exam to dictate.

- Radiologists review the selected exam on the Display Workstation and dictate a report into the RAYPAX system through a recording device. The dictated exam is sent to the 'Transcription' worklist.

- Transcriptionists select an exam from the [Root Folder/ Worklists/ Transcription] folder in the Exam Browser and open the exam to transcribe a report. The transcribed exam is sent to the 'Approval' worklist.

- Radiologists select an exam from the [Root Folder/ Worklists/ Approval] folder in the Exam Browser and open the exam to approve.

- Radiologists have three choices when approving an exam. The exam can be approved and finalized, forwarded to another radiologist, or sent back for re-transcription.

- Radiologists can forward the exam to another radiologist for a second opinion. The exam is sent to the [Root Folder/ Worklists/ Forwarded] folder in the Exam Browser. Forwarding can be canceled by the forwarding radiologist.

- When a radiologist receives an exam from another radiologist, the exam can be found in the receiving radiologist's [Root Folder/ Worklists/ Received] folder. The report for the selected exam can be viewed. A new report made by the receiving radiologist after

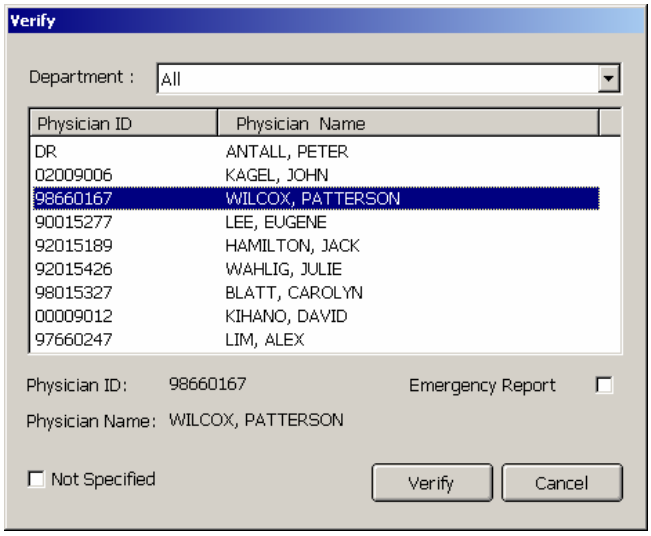
reviewing the exam can then be forwarded back to the forwarding radiologist, forwarded to another radiologist or approved and finalized.

Verify...

If exams are acquired in RAYPAX, then they have to be verified for use.

Before selecting the verify function, the **Brightness** and **Contrast** of all images should be adjusted in advance.

Once verification is successfully completed, the above message will be shown



Verify Dialog Box

- **Emergency Report :** If this is the Emergency Exam, check Emergency Report check box. Please refer Emergency Exam tab on Tools>Options for more information about Emergency Exam.
- **Not Specified :** If a specific physician will not be selected, check 'Not specified' check box.

To use **Verify**, select an exam in the Exam Browser and

- Press **[Ctrl]** + **[E]**, or
- Choose **Workflow** > **Verify** from the menu, or
- Click the **Verify** button in the Toolbox.

In the **Verify** dialog box,

- Select a **Department**.
- The physician list of the selected department will be shown.
- Select a physician or check the **Not Specified** box if a specific physician will not be selected.
- Click the **Verify** button.

Dictate...

Dictation is normally performed by the diagnosing radiologist. The radiologist who is responsible for the images reads the verified images and records his diagnosis/opinion. It is possible to write the report, but radiologists usually use a voice recording system.

Once the dictation is successfully saved, the above message will be shown.

Dictation Dialog Box

To use **Dictate**,

- Choose **Workflow** > **Dictate** from the menu, or
- Click the **Dictate** button in the Toolbox.

To record,

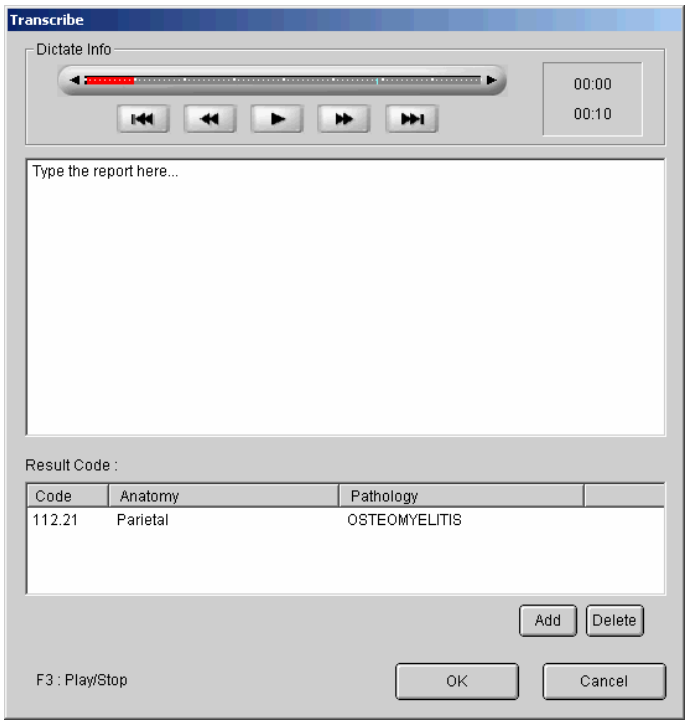
- Click the **Record** button, or press [**F5**].
- Click the **Pause** button, or press [**F5**] again, to momentarily stop recording.

- Playback functions can also be used to verify the recording.
- Click the **Save & Close** button when the recording is finished.

Transcribe...

A voice-recorded dictation must be transcribed into text.

When the procedure for dictation is complete, the exam will be sent to a transcriptionist. The transcriptionist who receives the dictation translates the voice dictation into a text report. Please refer to the diagram below.

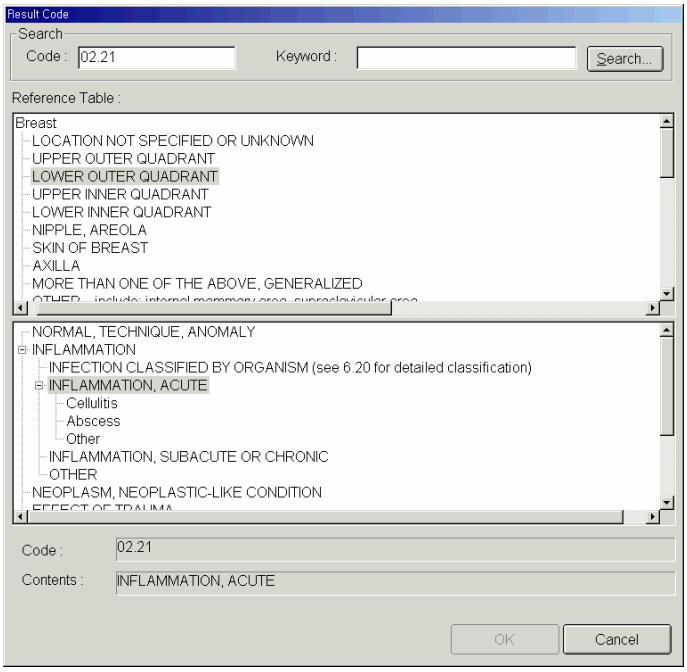


Transcription Dialog

To use **Transcribe**,

- Press **[Ctrl]** + **[T]**, or
- Choose **Workflow** > **Transcribe** from the menu, or
- Click the **Transcribe** button in the Toolbox.

Result Code Dialog If the transcriptionist clicks the **Add** button in the report window, the dialog box below will be displayed.



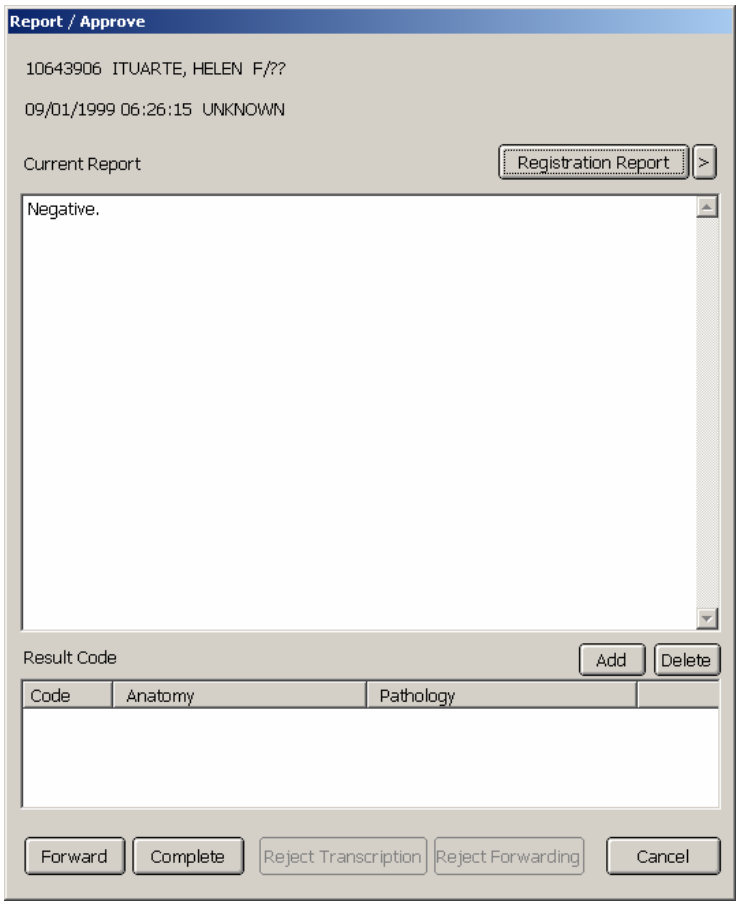
Result Code Dialog

To search for a result code:

- Type in the text to search on in the **Keyword** box and then click the **Search** button
- **Search results** will be displayed in a window appearing on the right side.
- Select one of the body parts that are displayed on the left side of the window under the upper section of the **Reference Table**.
- Select a diagnosis that is displayed in the lower section of the **Reference Table**, and then click **OK**.

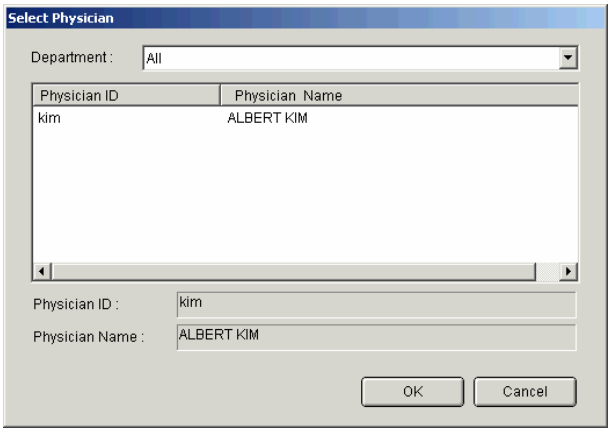
Report/Approve...

This function allows a radiologist to approve or reject a diagnostic report. There are three choices for approval: Approve the report for the exam, forward the exam to another radiologist, or send the exam back for re-transcription.



Report/Approve Dialog

Radiologists can forward exams to other radiologists by using the **Forward** button. Forwarding is useful for junior radiologists to send exams to senior radiologists for opinions, or when a radiologist is not fully confident in a diagnosis and wants a second opinion.



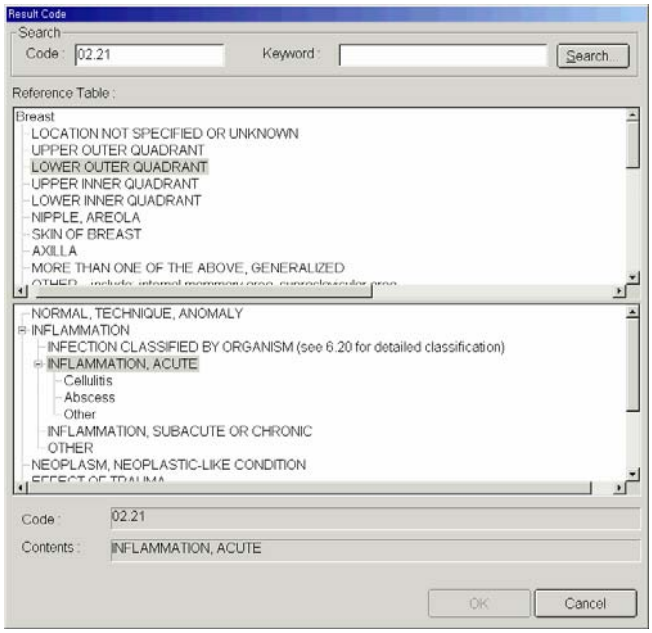
Select Physician Dialog Box

The **Select Physician** dialog box allows the selection of a radiologist to forward the exam to.

Pressing the **Complete** button finalizes the exam by approving the report. Once an exam is approved the report cannot be redone or modified.

Pressing the **Reject Transcription** button sends the exam back to have the transcription redone. An exam can be rejected because the transcription has errors or is not complete. This returns the exam back to the transcription worklist.

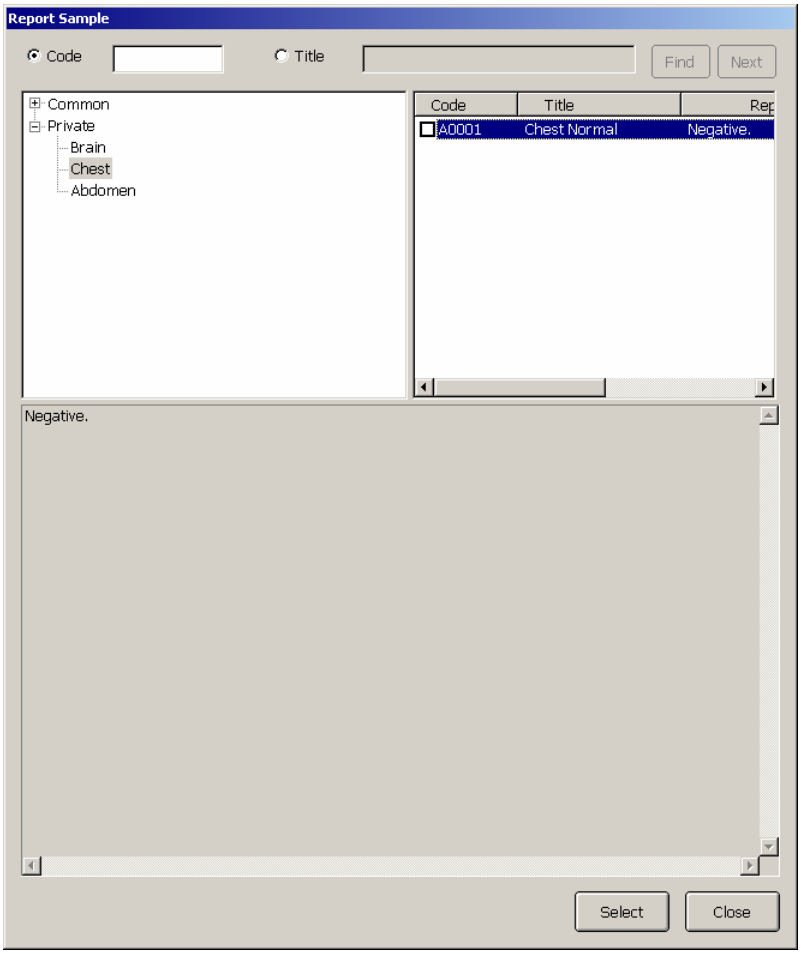
Pressing the **Reject Forward** button returns a forwarded exam as rejected and not complete. Exams can be rejected if there are errors, the exam was sent to the wrong radiologist or if the radiologist cannot diagnose the exam.



Result Code Dialog

If the **Add** button is clicked, the **Result Code** dialog box will be shown as above. Please refer to the **Transcribe** menu for details.

Radiologist can input the report and select the report which is already registered. If user click **Registration Report** button on Report/Approve Dialog Box, user can see the following Report Sample Dialog. If user select Report Sample and click 'Select' button selected Report sample will shows up on Report Text box of Report/Approve Dialog Box. Also Radiologist can create Report Sample.



Report Sample Dialog Box

To use **Report / Approve**,

- Press **[F10]**, or
- Choose **Workflow**> **Report / Approve** from the menu, or
- Click the **Report/Approve** button in the Toolbox.

Cancel Forwarding

Only the radiologist who forwarded an exam can cancel the forwarding of the exam.

To cancel the forwarding of an exam, select the exam from the [Root Folder/ Work history/ Forwarding] folder and

- Select **Workflow** > **Cancel Forwarding** from the menu.

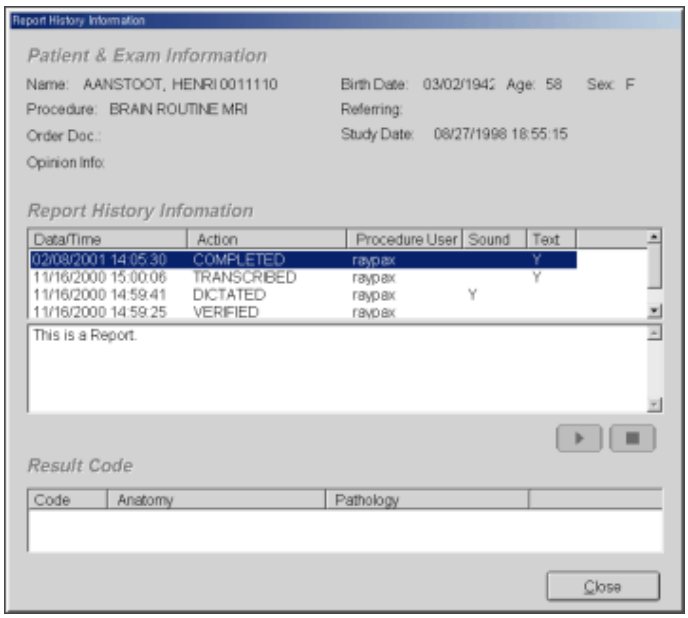
Report History…

This function displays the selected exam's report history information.

To view the **Report History**,

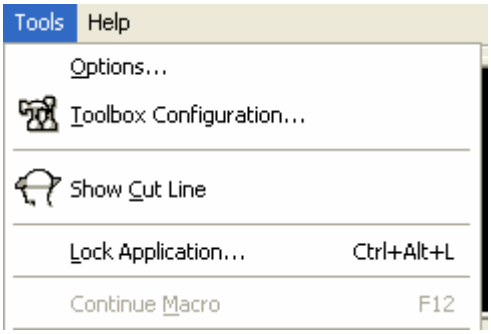
- Select **Workflow** > **Report History…** from the menu.

The history and information for the exam will be displayed as shown in the diagram below.



Report History Dialog

Tools



Options...

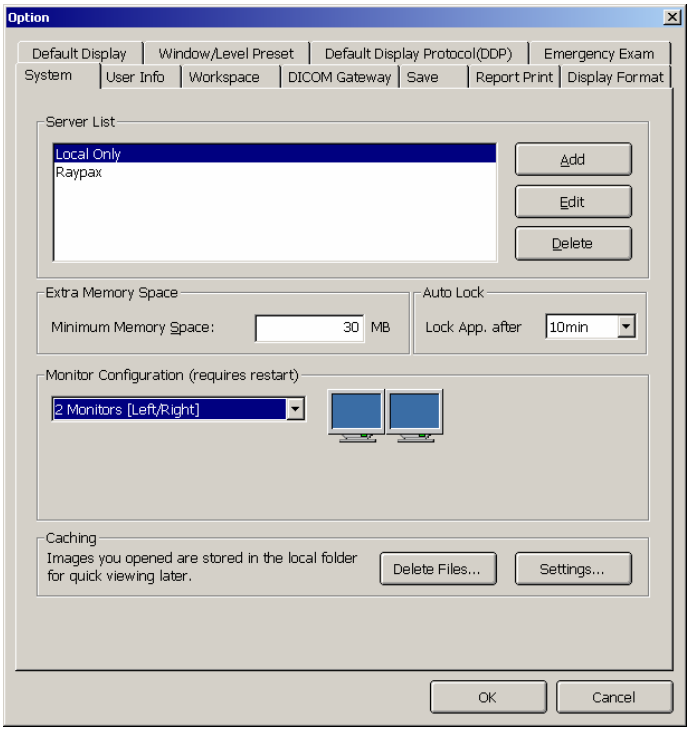
If **Options** is selected from the main menu or Exam Browser, the **Options** dialog box will be shown. Several parameters of the RAYPAX Display Workstation can be modified and saved. Options are separated into tabs as listed below.

System Tab

This shows the information for connected RAYPAX servers in the **Server List**. Servers can be added, edited or deleted using the corresponding buttons on the right side. The server name must be the same as the alias in the Oracle database client.

▪ **Monitor Configuration**

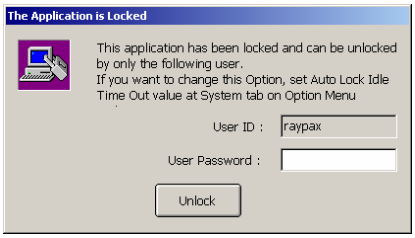
Regardless of the number of monitors being used, the configuration that is set will be used to display the RAYPAX Display Workstation. Thus if one monitor is being used and a 2 monitor configuration is set, the monitor will display 2 split windows for the Display Workstation.



System Tab

× The **Extra Memory Space** field is used to set the minimum memory space for other programs. In other words, all memory except the memory amount allocated in **Extra Memory Space** will be used by RAYPAX Display Workstation.

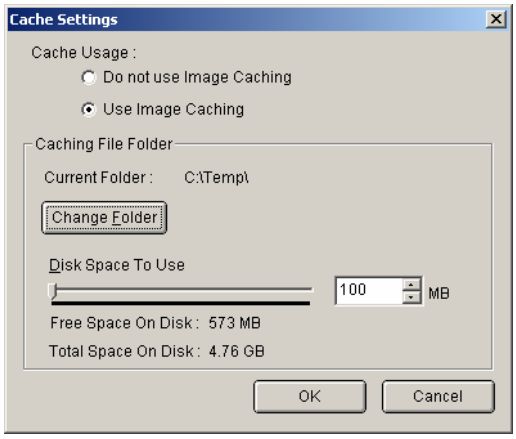
× **Auto Lock** field is used to set suspend time. This option can be configured by Admin Tool. If user does not use Display Workstation in amount of time, Display workstation will be locked. If user wants to unlock, input User Password and click Unlock button.


The Application is Locked
This application has been locked and can be unlocked by only the following user.
If you want to change this Option, set Auto Lock Idle Time Out value at System tab on Option Menu
User ID :
raypax
User Password :
Unlock

Application Lock

- The **Monitor Configuration** can be set to the multiple monitor settings found in the pull down list. Once a monitor setting has been made, the program must be restarted.

- **Caching** allows exams that were previously viewed to be stored locally for quick and easy access at a later time. This is convenient for the pre-fetching of exams to be viewed by a radiologist at an appointed time. Click on **Settings…** to set the parameters for the caching function. Click on **Delete Files** to delete the cache.



Cache Settings Dialog Box

User Info Tab

This displays the user's information as shown in the diagram below.

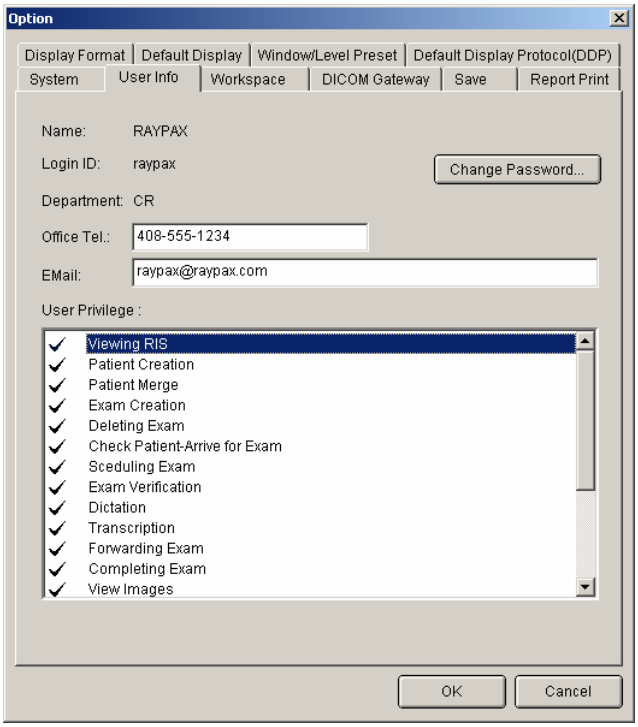
Telephone number, e-mail address, and password can be modified.

Also, **User Privileges** for the user can be viewed, but cannot be modified.

▪ **Change Password Dialog**

To change the password for login, click the **Change Password** button.

- Type in the appropriate password information in the **Current Password**, **New Password** and **Confirm Password** fields.
- Click **OK** to change the password; otherwise, click **Cancel** to cancel the operation.

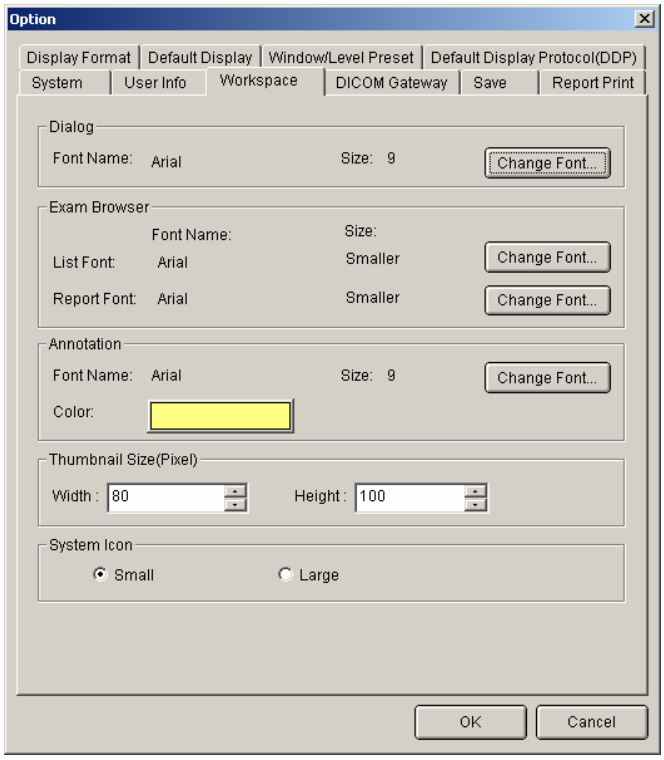


User Info Tab

Workspace Tab

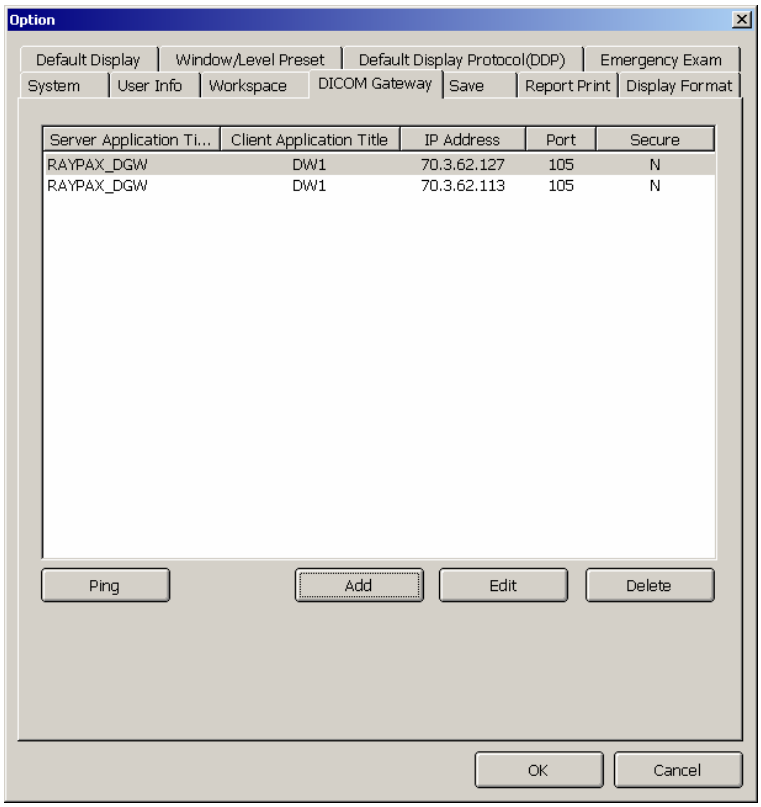
The default font and size of the workspace environment can be adjusted by section. The available sections for adjustment are the dialog box, Exam Browser, annotation, thumbnail size and system icon size.

Changing the settings in these sections will display them as the default for the logged in user only.



Workspace Tab

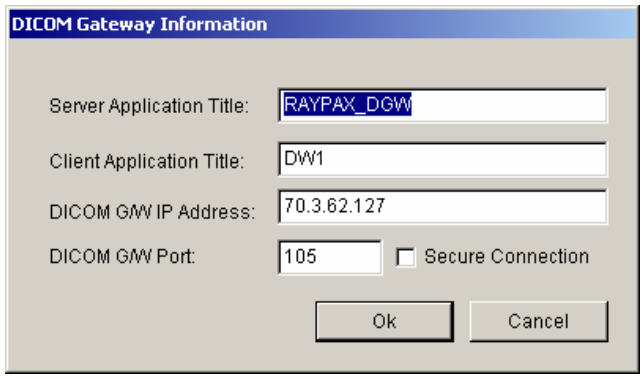
DICOM Gateway Tab



DICOM Gateway Tab

User can register DICOM Gateway.

If user click **Edit** button, following DICOM Gateway Information Dialog box will be appeared.



DICOM Gateway Information Dialog Box

The following parameters can be modified.

- **Server Application Title** This corresponds to the SCP's (Service Class Provider) AE (Application Entity) title in terms of DICOM 3.
- **Client Application Title** This corresponds to the SCU's (Service Class User) AE (Application Entity) title in terms of DICOM 3.
- **IP Address** DICOM Gateway IP Address
- **Port** TCP/IP port number of DICOM Gateway
- **Secure Connection** DICOM Secure Connection option

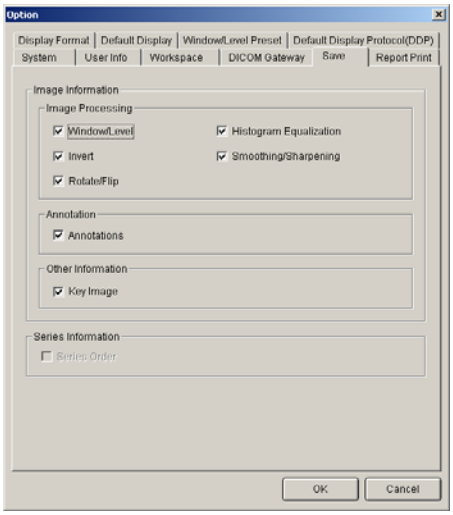
User can create new DICOM Gateway click **Add** button or can delete DICOM Gateway click **Delete** button.

Save Tab

▪ **Save**

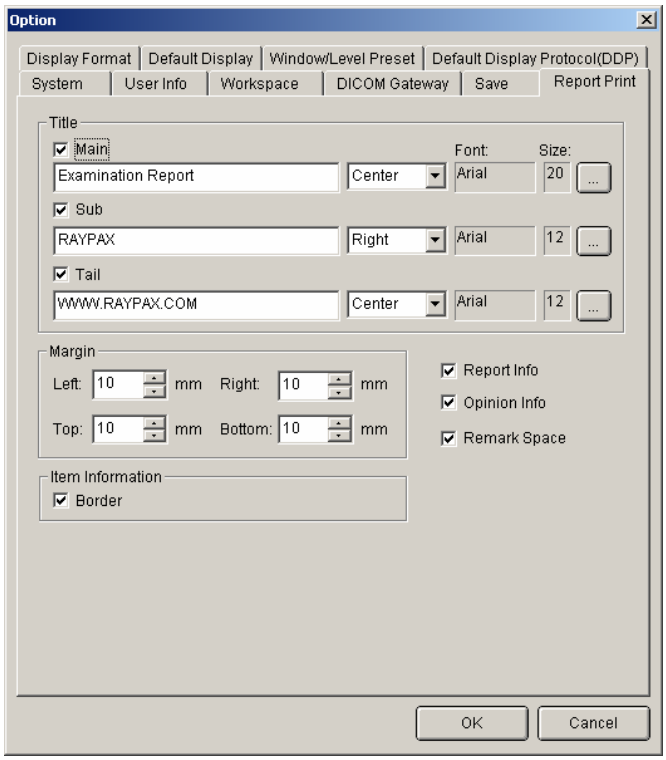
The save exam and save annotation privileges can be set in the Admin Tool.

This function gives the option to save only certain changes to images. Check the boxes for the changes that are to be saved when **Save** or **Save All** is selected from the main menu.



Save Tab

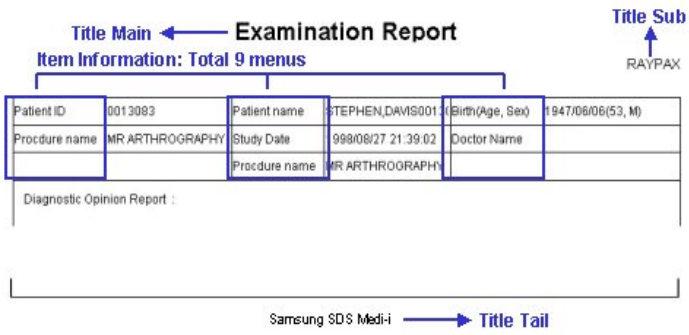
Report Print Tab



Report Print Tab

The following parameters can be modified.

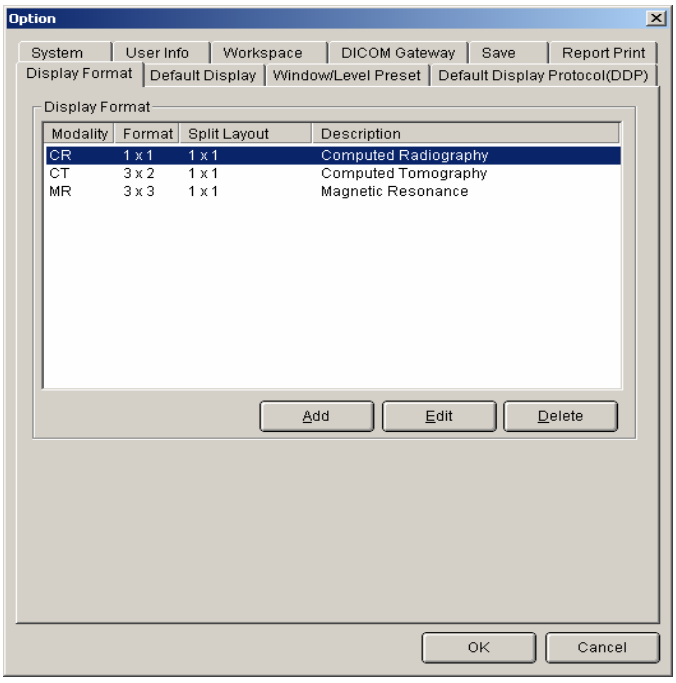
- **Title** Type in each title and select the position, font, and size.
- **Margin** Input a number or click the increase or decrease button.
- **Item Information** Select the items that are to be included in the report by checking the corresponding boxes.



Example of Report

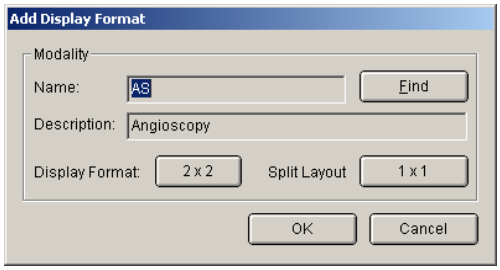
Display Format Tab

The default display format for each modality can be set. The standard format and the split layout can be set to the desired display format.



Display Format Tab

To add a display format, click on the **Add** button and the **Add Display Format** dialog box will appear as below. Click the **Find** button to select the modality to set the display format for. Change the **Display Format** and **Split Layout** fields to the desired format settings. To finish, click **OK**.

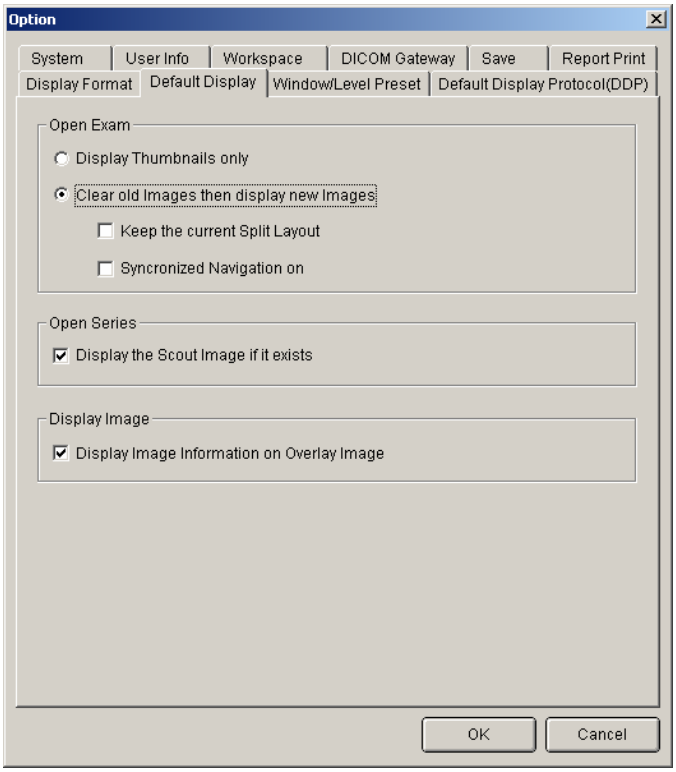


Add Display Format Dialog

Display formats can also be edited or deleted by selecting the display format from the list and clicking the appropriate button.

Default Display Tab

When opening an exam that has more than one series, or if many exams are opened, it is possible to set the display format for different features including split layout, comparison exams and scout images.



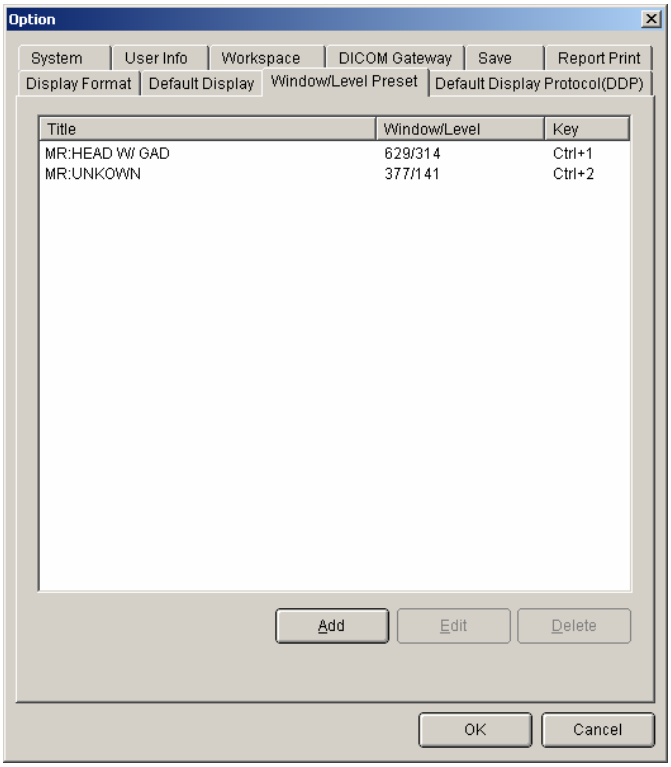
Default Display Tab

The following parameters can be modified.

- **Open Exam** Settings for the initial default display when opening an exam can be modified.
- **Open Series** Settings for the initial default display when opening a series can be modified.
- **Display Image** Display image information can be shown on an overlay image.

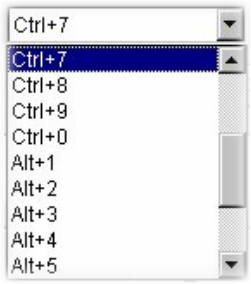
Window/Level Preset Tab

The Window/Level settings can be saved for later use with the same images. The settings are also available for use with other images by saving them as pre-defined settings.

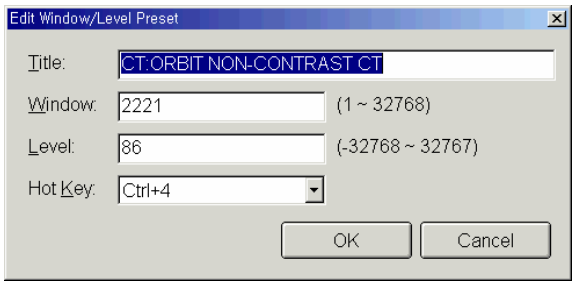


Window/Level Preset Tab

To preset the Window/Level,



- Click the **Add** button.
- Enter the **Title** and the **Window** and **Level** parameters.
- Select a **Hot Key** from the pull-down menu (20 hot key combinations are available: [**Alt**] + **0~9** and [**Ctrl**] + **0~9**)



Edit Window/Level Preset Dialog

- Click the **OK** button to add the preset; otherwise, click the **Cancel** button to stop the operation.

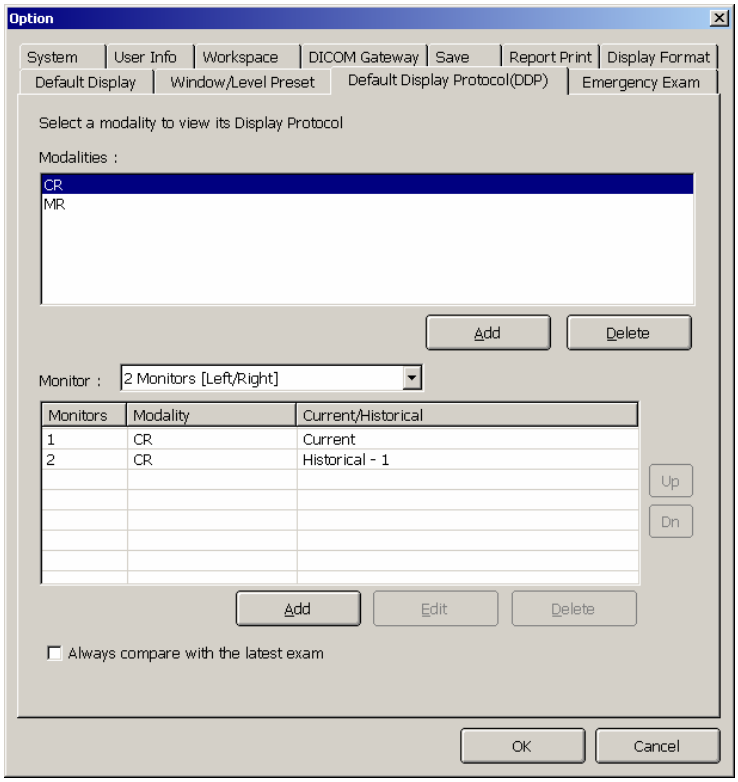
Default Display Protocol (DDP) Tab

▪ **Open Comparison Exam**

This is a function to automatically open patient exams that are related to the selected exam for comparison.

The **Default Display Protocol** function allows pre-configured viewing of Comparison Exams. When an exam is opened using the **With Comparison Exam** function, related exams for that patient can be opened as well for comparison. The arrangement of these exams on the available monitors is determined by the parameters set with the **Default Display Protocol**.

For details on the use of the **With Comparison Exam** function, refer to the **Tools** menu of the Exam Browser in this manual.

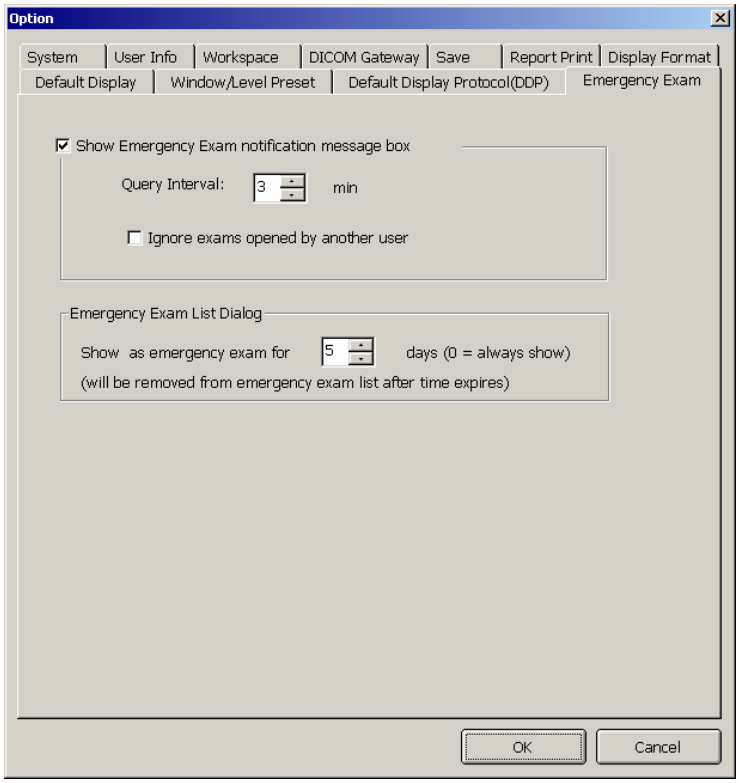


Default Display Protocol (DDP) Tab

- If user unchecks **Always compare with the latest exam** check box, when user open the exam, selected exam will be current Exam. If user checks this check box, the latest exam will be Current exam.

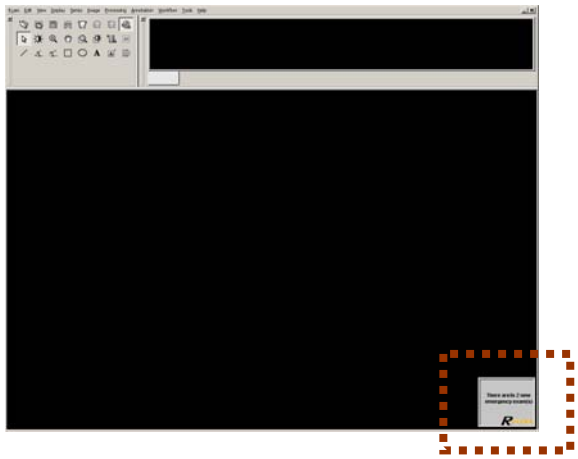
Emergency Exam Tab

If user have the privilege, user can see Emergency Exam tab.



Emergency Exam Tab

- If user check **Show Emergency Exam notification message box check box,** when Emergency Exam occur user can see the message box like following picture. At this time, if user clicks the Message, Emergency Exam Dialog will be appeared.



Emergency Exam notification message box

- **Query Interval :** Search interval selection for Emergency Exam.
- **Ignore exams opened by another user :** If this box is checked, the Emergency Exam that is already opened by the other user will not be notified.
- **Emergency Exam List Dialog :** Set expiration period by Study Date

Toolbox Configuration…

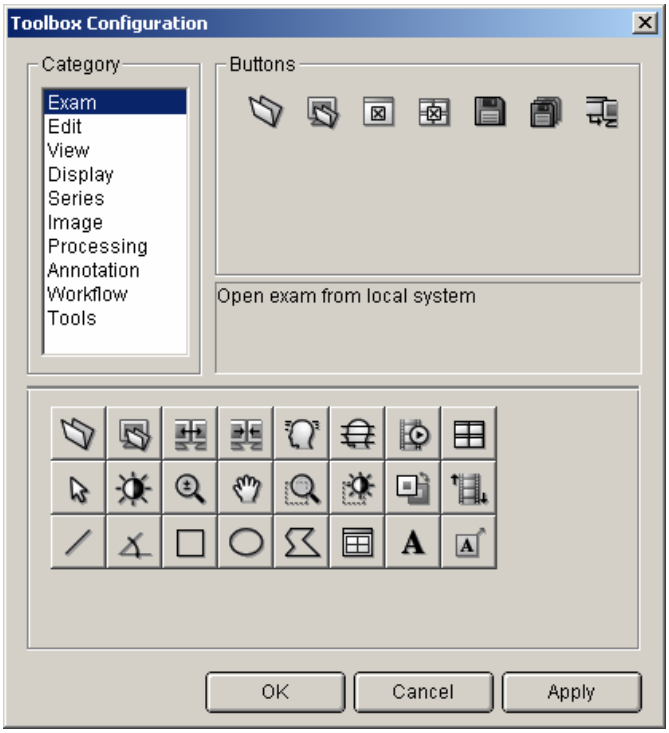
The Toolbox configuration and buttons can be customized.

To edit the Toolbox configuration,

- Choose **Tools** > **Toolbox Configuration**, or
- Click the **Toolbox Configuration** button in the Toolbox.

▪ **Drag & Drop Buttons**

To add buttons, drag them from the Buttons menu and drop them onto the Toolbox configuration. To remove buttons, drag them from the Toolbox configuration and drop them outside the window.



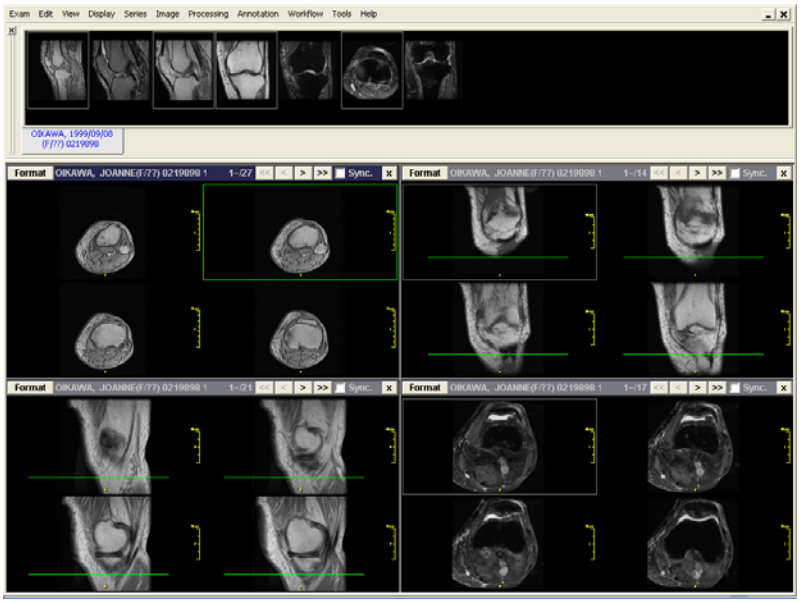
Toolbox Configuration Dialog

Choose a category from the **Category** menu on the left side and drag and drop buttons from the **Buttons** menu as described in the side bar. Buttons can be rearranged once placed in the Toolbox configuration section at the bottom of the window. A description of the button function can be seen when you place the mouse pointer over the button icon in the **Buttons** menu. Click the **OK** button to complete configuration.

Show Cut Line

This function allows for show Cut line on images.

If user enables this function, user can see the reference line to a cross-section of the images like following picture.



Cut Line Windows

Continue Macro

The Macro function allows for easy duplication of job tasks. There are three different macros; Review Macro, Verification Macro and Dictation Macro.

Review Macro is for repeating an image search function, Verification Macro is for repeating an exam verification task, and Dictation Macro is for repeating an exam dictation task.

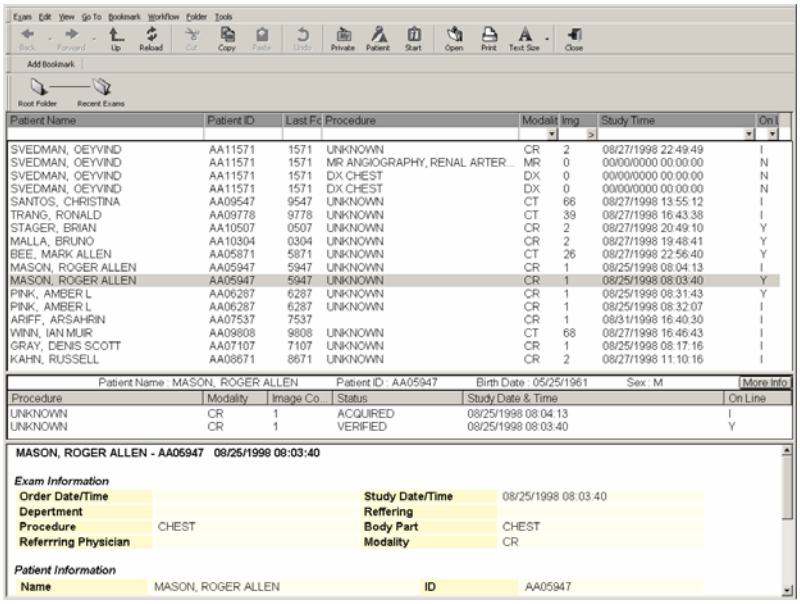
To start the Macro function, go to **Tools** > **Verification** (or **Review** or **Dictation**) **Macro Start** in the Exam Browser (Please refer to *Chapter 3 Exam Browser*).

When a macro is started, the first available exam for the macro task will be opened in the Image Display Window. Select **Tools** > **Continue Macro** from the menu, or press the **F12** button, to continue with the macro task. Once the macro task for the exam is finished or canceled, the next available exam for the macro task will be opened automatically in the Image Display Window.

To stop the Macro function, select **Tools** > **Macro Stop** in the Exam Browser.

3 Exam Browser

This chapter describes the menu items in the RAYPAX Display Workstation Exam Browser.


Exam Edit View Go To Bookmark Workflow Folder Tools
Back Forward Up Reload Cut Copy Paste Undo Private Patient Start Open Print Text Size Close
Add Bookmark
Root Folder Recent Exams
Patient Name Patient ID Last Fc Procedure Modalit Img Study Time On l
SVEDMAN, OEYVIND AA11571 1571 UNKNOWN CR 2 08/27/1998 22:49:49 I
SVEDMAN, OEYVIND AA11571 1571 MR ANGIOGRAPHY, RENAL ARTER... MR 0 00/00/0000 00:00:00 N
SVEDMAN, OEYVIND AA11571 1571 DX CHEST DX 0 00/00/0000 00:00:00 N
SVEDMAN, OEYVIND AA11571 1571 DX CHEST DX 0 00/00/0000 00:00:00 N
SANTOS, CHRISTINA AA09547 9547 UNKNOWN CT 66 08/27/1998 13:55:12 I
TRANG, RONALD AA09778 9778 UNKNOWN CT 39 08/27/1998 16:43:38 I
STAGER, BRIAN AA10507 0507 UNKNOWN CR 2 08/27/1998 20:49:10 Y
MALLA, BRUNO AA10304 0304 UNKNOWN CR 2 08/27/1998 19:48:41 Y
BEE, MARK ALLEN AA05871 5871 UNKNOWN CT 26 08/27/1998 22:56:40 Y
MASON, ROGER ALLEN AA05947 5947 UNKNOWN CR 1 08/25/1998 08:04:13 I
MASON, ROGER ALLEN AA05947 5947 UNKNOWN CR 1 08/25/1998 08:03:40 Y
PINK, AMBER L AA06287 6287 UNKNOWN CR 1 08/25/1998 08:31:43 Y
PINK, AMBER L AA06287 6287 UNKNOWN CR 1 08/25/1998 08:32:07 I
ARIFF, ARSAHRIN AA07537 7537 CR 1 08/31/1998 16:40:30 I
WINN, IAN MUIR AA09808 9808 UNKNOWN CT 68 08/27/1998 16:46:43 I
GRAY, DENIS SCOTT AA07107 7107 UNKNOWN CR 1 08/25/1998 08:17:16 I
KAHN, RUSSELL AA08671 8671 UNKNOWN CR 2 08/27/1998 11:10:16 I
Patient Name : MASON, ROGER ALLEN Patient ID : AA05947 Birth Date : 05/25/1961 Sex : M More Info
Procedure Modality Image Co.. Status Study Date & Time On Line
UNKNOWN CR 1 ACQUIRED 08/25/1998 08:04:13 I
UNKNOWN CR 1 VERIFIED 08/25/1998 08:03:40 Y
MASON, ROGER ALLEN - AA05947 08/25/1998 08:03:40
Exam Information
Order Date/Time
Study Date/Time 08/25/1998 08:03:40
Department
Reffering
Procedure CHEST
Body Part CHEST
Referrring Physician
Modality CR
Patient Information
Name MASON, ROGER ALLEN
ID AA05947

RAYPAX Display Workstation Exam Browser GUI

The **Exam Browser** can be accessed by selecting **Open…** from the menu bar under **Exam** or by clicking the **On-line Open** button in the Toolbox.

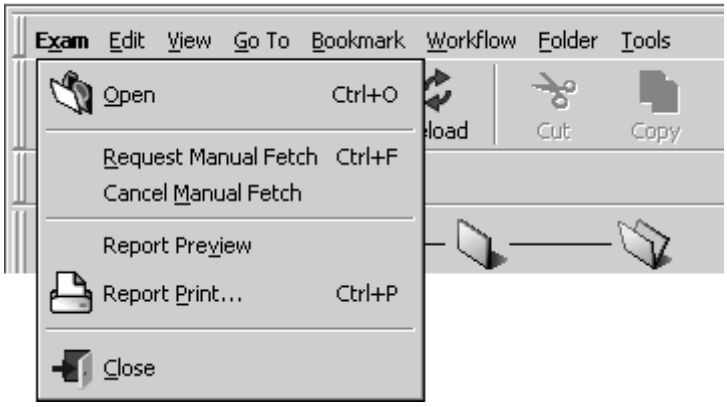
Menu bar

The Menu bar is composed of 9 menu items.

Menu of Exam Browser

Exam

The following are the descriptions of the submenus of the **Exam** menu.



Open...

This allows you to open an exam for viewing or performing workflow tasks.

To open an exam, select an exam record and

- Double click the selected exam record, or
- Select **Exam** > **Open…** from the menu, or
- Click the **Open** button on the Tool bar.

Request Manual Fetch

The **Request Manual Fetch** function requests that specified exams that are not in the Short Term Storage (STS) be restored from the Long Term Archive (LTA).

This function is only available when the desired exam is offline, which is denoted by **N** under the **On Line** column in the Exam Browser.

The manual fetch procedure requests the retrieval of a specific exam of a specific patient to be brought online into the STS for viewing.

When this function is run, a window asking for the priority of the fetch will be displayed, as shown below. After selecting the desired priority, click on **OK**.

Manual Fetch Window

Cancel Manual Fetch

This function cancels a request made using the **Request Manual Fetch** function.

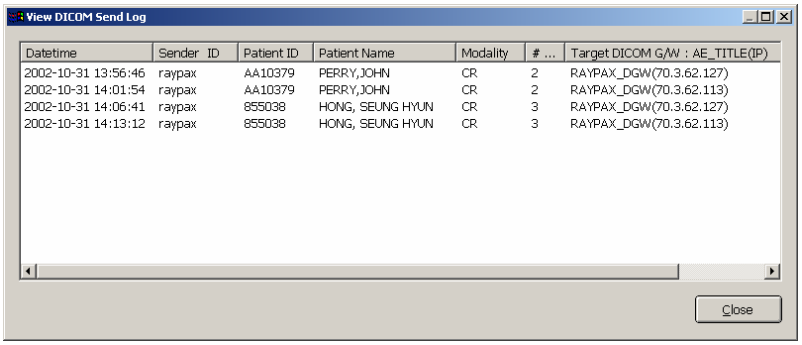
Print

This function allows the printing of an exam and its images.

To **Print** from the Exam Browser,

- Press **[Ctrl]** + **[P]**, or
- Select **Exam** > **Print** from the menu, or
- Click the **Print** button on the Tool bar.

Please refer to **View** DICOM Send Log…


View DICOM Send Log
Datetime
Sender ID
Patient ID
Patient Name
Modality
...
Target DICOM G/W : AE_TITLE(IP)
2002-10-31 13:56:46 raypax AA10379 PERRY,JOHN CR 2 RAYPAX_DGW(70.3.62.127)
2002-10-31 14:01:54 raypax AA10379 PERRY,JOHN CR 2 RAYPAX_DGW(70.3.62.113)
2002-10-31 14:06:41 raypax 855038 HONG, SEUNG HYUN CR 3 RAYPAX_DGW(70.3.62.127)
2002-10-31 14:13:12 raypax 855038 HONG, SEUNG HYUN CR 3 RAYPAX_DGW(70.3.62.113)
Close

DICOM Send Log

Print in *Chapter 2 Display Workstation*.

Close

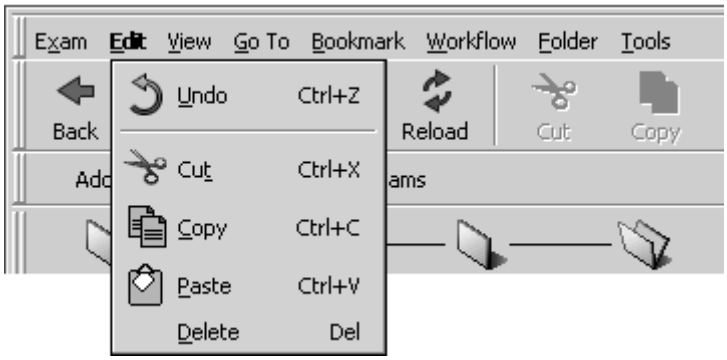
This function closes the Exam Browser and goes back to the Image Viewer of the RAYPAX Display Workstation.

To **Close** the Exam Browser,

- Select **Exam** > **Close** from the menu, or
- Click the **Close** button on the Tool bar.

Edit

The following are the descriptions of the submenus of the **Edit** menu.



Undo

The **Undo** function reverses the last **Cut**/**Paste**/**Delete** operation. When undoing the last operation, the Exam Browser displays the folder that the last operation was performed in.

To **Undo** the last operation,

- Press **[Ctrl]** + **[Z]**, or
- Choose **Edit** > **Undo**, or
- Click the **Undo** button on the Tool bar.

Cut

The **Cut** operation is used essentially to move an exam to another folder. Using the **Paste** function in conjunction will accomplish this. A cut exam is not removed until it is pasted into another folder. If an exam has been moved in error, it can be immediately reversed using the **Undo** function.

This operation can be applied only within a write accessible folder.

To **Cut** an exam, select the exam to cut and

- Press **[Ctrl]** + **[X]**, or
- Choose **Edit** > **Cut**, or

- Click the **Cut** button on the Tool bar.

Copy

This function copies a selected exam into memory. The exam can then later be pasted into another location using the **Paste** function.

To **Copy** an exam, select the exam to copy and

- Press **[Ctrl]** + **[C]**, or
- Choose **Edit** > **Copy** from the menu, or
- Click the **Copy** button on the Tool bar.

Paste

This function pastes exams that have been cut or copied into a selected folder. The selected folder must be write accessible by the user or else the paste will not work.

To **Paste** an exam, select the folder to paste into and

- Press **[Ctrl]** + **[V]**, or
- Choose **Edit** > **Paste** from the menu, or
- Click the **Paste** button on the Tool bar.

Delete

This function permanently removes the selected exam from the folder.

This operation can be applied only within a write accessible folder.

To **Delete** an exam, select the exam to delete and

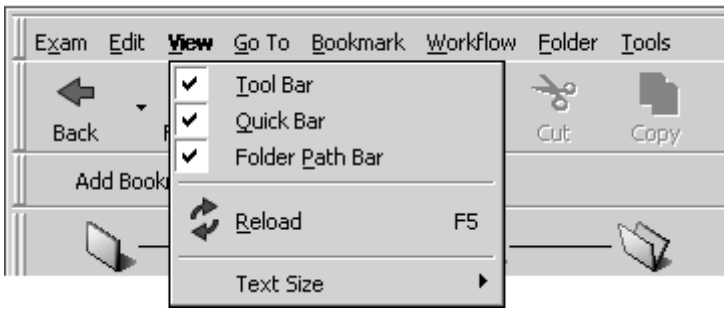
- Press **[Del]**, or

- Choose **Edit** > **Delete** from the menu.

View

The following are the descriptions of the submenus of the **View** menu.

These are toggle style menus.



Tool Bar

This hides or unhides the Tool Bar. A check mark beside the name indicates that it is being displayed.

Quick Bar

This hides or unhides the Quick Bar. A check mark beside the name indicates that it is being displayed.

Folder Path Bar

This hides or unhides the Folder Path bar. A check mark beside the name indicates that it is being displayed.

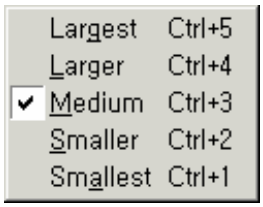
Reload

This updates the folder content area with current database data.

Text Size

This shows the font size for the Exam Browser.

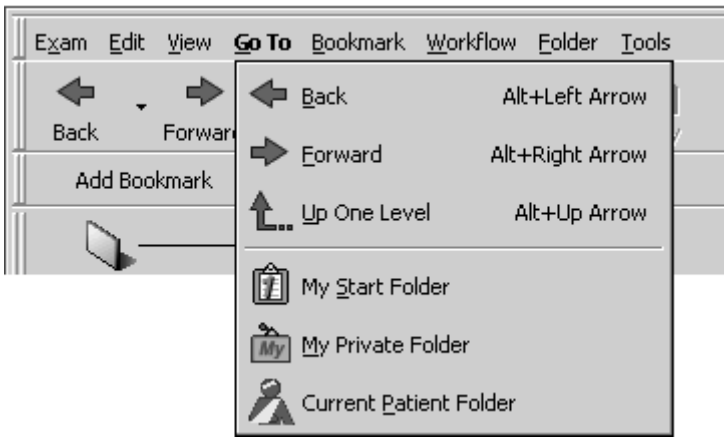
To change the font size,



- Choose **View** > **Text Size** > **[*Selected font size*]** from the menu, or
- Click the arrow button beside the **Text Size** button on the Tool bar and select a font size, or
- Press **[Ctrl]** and the corresponding number (1 ~ 5) for the desired font size, as shown in the side bar.

Go To

The following are the descriptions of the submenus of the **Go To** menu.



Back

This moves the folder view to the previous folder.

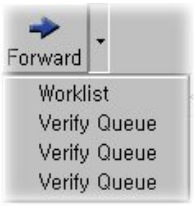
If the arrow button located to the right of the **Back** button is clicked, it will display a drop down folder list of previously viewed folders that can be chosen from.

To go **Back** to a previous folder,

- Select **Go To** > **Back** from the menu, or
- Press **[Alt]** + **[←]** or,
- Click the **Back** button on the Tool bar.

Forward

This moves the folder view to the folder previous to a **Back** move.



If the arrow button located to the right of the **Forward** button is clicked, it will display a drop down folder list of previously viewed folders before a **Back** move that can be chosen from.

To go **Forward** to a folder,

- Select **Go To** > **Forward** from the menu, or
- Press **[Alt]** + **[→]** or,
- Click the **Forward** button on the Tool bar.

Up one Level

This moves the folder view to the folder that is one level higher in the folder directory (i.e. the parent folder).

To move **Up one Level**,

- Select **Go To** > **Up One Level** from the menu, or
- Press **[Alt]** + **[Up arrow]**, or

- Click the **Up** button on the Tool bar.

My Start Folder

This moves the folder view to the folder that is designated as **My Start Folder**.

To move to **My Start Folder**,

- Select **Go To** > **My Start Folder** from the menu, or
- Click the **Start** button on the Tool bar.

My Private Folder

This moves the folder view to the folder that is designated as **My Private Folder**.

- Select **Go To** > **My Private Folder** from the menu, or
- Click the **Private** button on the Tool bar.

Current Patient Folder

This moves the folder view to the folder that contains the whole exam for the selected patient, including the current selected exam.

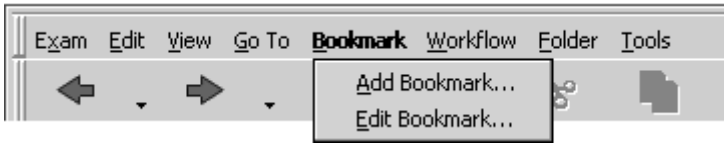
To go to the **Current Patient Folder**,

- Select **Go To** > **Current Patient Folder** from the menu, or
- Click the **Patient** button on the Tool bar.

Bookmark

It is possible to add or edit bookmarks as buttons on the Quick Bar for convenient access to frequently used folders.

Bookmarks can only be made for folders.

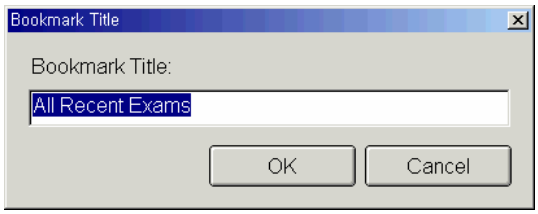


Add Bookmark

This allows a new bookmark to be added to the Quick Bar.

To add a bookmark, open the folder to make a bookmark for and

- Select **Add Bookmark** from the menu.
- Enter the **Bookmark Title** when the **Bookmark Title** dialog box appears (or accept the default name).
- Click **OK**.
- The new bookmark will appear on the Quick Bar.



Bookmark Title Dialog

Edit Bookmark

A bookmark can be edited. Editing functions include deleting, renaming, and changing display order on the Quick Bar.

- **Edit Bookmark**

Delete

Deletes the selected bookmark.

Rename

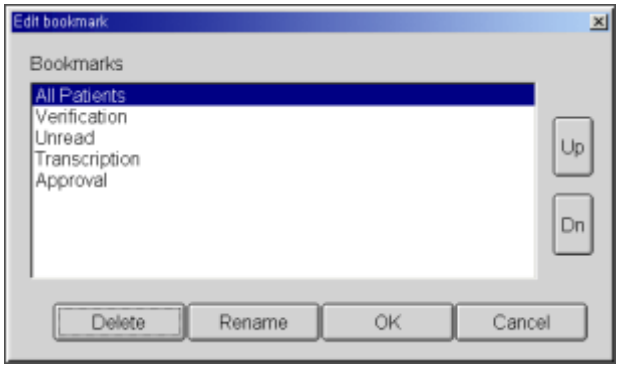
Renames the selected bookmark.

Up

Moves the selected bookmark up in the order.

Down

Moves the selected bookmark down in the order.



Edit Bookmark Dialog

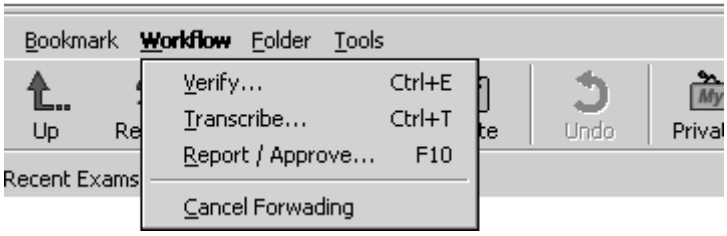
To edit a bookmark on the Quick Bar,

- Select **Edit Bookmark** from the menu.
- Select a bookmark to edit and click one of the edit buttons.
- When finished, click **OK**.
- The changes can be seen on the Quick Bar.

Workflow

The **Workflow** menu is the same as the workflow in the Image Viewer of the RAYPAX Display Workstation.

Please refer to the **Workflow** menu in *Chapter 2 Display Workstation*.



Verify

To start the **Verify** workflow task,

- Press **[Ctrl]** + **[E]**, or
- Select **Workflow** > **Verify** from the menu.

Transcribe

To start the **Transcribe** workflow task,

- Press **[Ctrl]** + **[T]**, or
- Select **Workflow** > **Transcribe** from the menu.

Report/Approve

To start the **Report**/**Approve** workflow task,

- Press **[F10]**, or
- Select **Workflow** > **Report/Approve** from the menu.

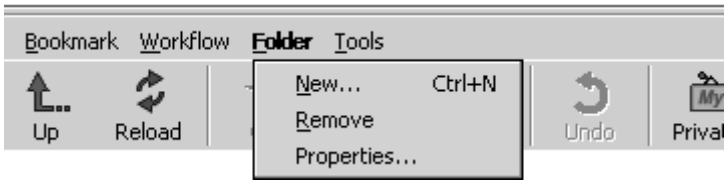
Cancel Forwarding

To **Cancel Forwarding** of an exam that has been forwarded to another radiologist,

- Select **Workflow** > **Cancel Forwarding** from the menu.

Folder

Folders in the Exam Browser can be configured to conform to the hospital environment with Admin Tool. The **Folder** menu is only activated when **Private Folder** is used.

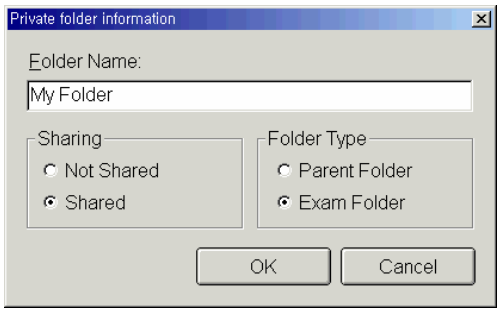


New

A new folder can be created within the **Private Folder**. A new folder cannot be created in a folder that contains exams.

To create a new folder,

- Press **[Ctrl]** + **[N]**, or
- Select **Folder** > **New…** from the menu.



Private Folder Information Dialog Box

When creating a new folder, fill in the **Folder Name**, select the **Folder Type**, and select the folder **Sharing** attribute.

If the **Shared** attribute is selected, this new folder will be shared with others. This means people have read permission in this folder, but it does not mean people can create/delete in this folder.

Remove

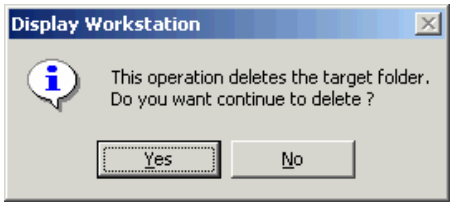
Folders can be deleted within the **Private Folder**.

To remove a folder, select a folder to remove and

- Select **Folder** > **Remove** from the menu.

If the selected exam folder contains image data, then an alert box will be displayed and will ask for confirmation of the delete operation.

A parent folder that contains at least one subfolder cannot be removed until all the subfolders are removed manually.



Remove Folder Confirm Message Box

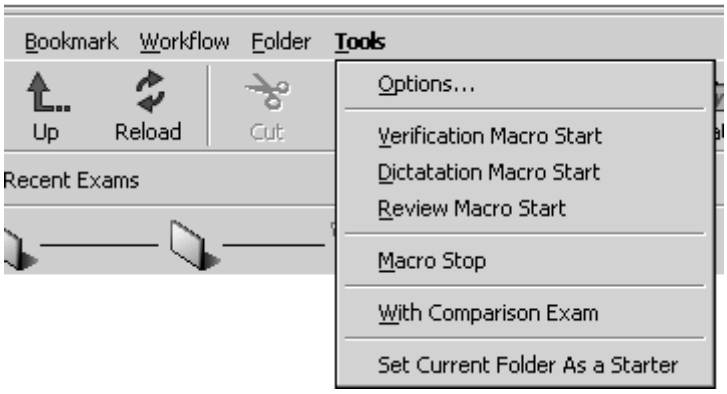
Properties

The properties of folders can be viewed for folders within the **Private Folder**. The name and sharing attributes of a selected folder can be changed.

To view/change properties of a folder, select a folder and

- Select **Folder** > **Properties…** from the menu.

Tools



Options...

The **Options** menu is the same as in the Image Viewer menu in the RAYPAX Display Workstation.

Please refer to the **Options** menu in *Chapter 2 Display Workstation*.

Macro Start

This function automates tasks in the workflow, including verification, dictation and review.

To use a macro,

- Select **Tool** > **Verification** (or **Dictation** or **Review**) **Macro Start** in the Exam Browser.
- The first exam from the workflow exam list, for the selected workflow task, will be displayed in the Image Display Window. (For example, exams that are not verified in the case of **Verification Macro**)
- Select **Tools** > **Continue Macro** from the menu of the Image Display Window.
- In the case of **Verification Macro**, the **Verify** dialog box will be displayed; in the case of **Dictation Macro**, the **Dictate** dialog box will

be displayed. If the dialog box and the present exam are closed, the next exam will be displayed. In the case of **Review Macro**, there is no dialog box, so when the present exam is closed the next exam will be displayed.

- When all exams from the workflow exam list are done, a dialog box will ask whether to repeat the above macro for any recently added exams.

- If **Yes** is clicked, the first exam from the refreshed list will be displayed; if **No** is clicked, the macro function will quit.

Macro Stop

This function stops the macro started using the **Macro Start** function.

To stop a macro, select **Tools** > **Stop Macro** in the Image Display Window or the Exam Browser.

With Comparison Exam

This function, when a patient's exam is being opened, opens related exams for the patient for comparison. Related exams are determined by exam procedure for exams using the same modality, and by body part for exams using different modalities.

To use the **With Comparison Exam** function,

- Select **Tools** > **With Comparison Exam** from the Exam Browser.

When exams are opened using the **With Comparison Exam** function, the layout configuration from the **Default Display Protocol** settings will be used to arrange the exams in the Image Display Window.

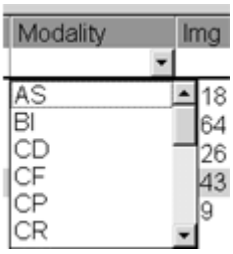
Set Current Folder as Start Folder

This function sets the current folder as the start folder. When logging into

Display Workstation, this will be the folder that will be opened in the Exam Browser.

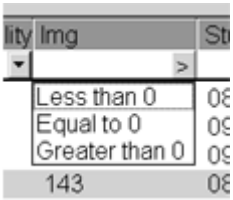
Search Grid

- **Drop Down: Modality Query**



- **Calendar: Study Time Search**

- **Numeric: Img search**



The Query Field can be used to filter the contents of a folder. The Query Field is composed of a Field Header and a Field Editing area. Each Field Header can be resized by dragging the right edge of the field after clicking on it, or by double clicking on the right edge of the field to match the heading text width. The Field Editing area accepts text input for queries on the folder contents for that particular field. Once text is input, pressing **[Enter]** will execute the query.

The folder content, name and number of Field Header items may be different according to the type of folder. If the column header is clicked on, the column will be sorted alphabetically or numerically. However, this type of sorting may take a long time.

There are 4 types of input for searches.

- **Edit Box** Input text in the edit box and press **[Enter]**. A query for items that start with the inputted text will be made and then displayed. This input type is used for Patient Name, Patient ID, etc.
- **Drop Down Menu** Select search criteria from the drop down menu. This input type is used in the modality search.
- **Calendar** Select a date to search for using the calendar. This input type is used for Birth Date, Study Time, etc.
- **Numeric** Input a number to search on and select the equation sign for the search (i.e. less than, equal to, or greater than). For example if **70** is inputted and **equal to** is selected, the query will display all exams

that contain exactly 70 images.

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